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ROYAL BOTANIC GARDENS, SYDNEY

National Herbarium of New South Wales

TELOPEA

ROYAL BOTANIC GARDENS, SYDNEY

Contributions from the National Herbarium of New South Wales

Vol. 2 (5) 1984

W.W. Watts
1856–1920

The Rev. W.W. Watts was Honorary Curator of Cryptogams at the National Herbarium of New South Wales (1909-1916); many thousands of his collections of mosses, hepatics and ferns are housed in the Herbarium. He contributed greatly to our knowledge of these groups during his lifetime, through publications and by exchange of specimens with overseas herbaria. Botany was his hobby; his occupation was minister in the Presbyterian Church of New South Wales. The *W.W. Watts Room* houses the cryptogamic collections of the National Herbarium of New South Wales. (This photo has been donated by his two grand-daughters Mrs Thorburn and Mrs Morris.)

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This issue is dedicated to the memory of
WILLIAM WALTER WATTS
1856–1920

Telopea 2(4) was distributed on 13 October 1983

CENSUS OF NEW SOUTH WALES MOSSES

Helen P. Ramsay*

(Accepted for publication 29.3.1983)

ABSTRACT

Ramsay, Helen P. (School of Botany, University of New South Wales, Kensington, N.S.W. Australia 2033) 1984. Census of New South Wales Mosses. Telopea 2(5): 455-533 — The Census gives a checklist containing 527 species of mosses in 171 genera and 56 families. Compilation of the list is based on literature and information obtained from herbarium specimens in Australian herbaria. The distribution of species is recorded for 13 ecogeographic regions of New South Wales. Included are lists of synonyms, *nomina nuda*, unsubstantiated records and a bibliography.

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INTRODUCTION

The compilation of a checklist of New South Wales mosses and their distribution was undertaken in an effort to determine how much information was available on New South Wales mosses in the literature and in collections based in Australian herbaria. Reverend W.W. Watts and T. Whitelegge early this century (1902, 1905) published lists of Australian mosses, incorporating information from previous work of Mitten (1856, 1860, 1882) and Forsyth (1899). Watts was responsible for collecting many new species determined by Brotherus in the period 1896–1918. The Census Muscorum Australiensium (Watts and Whitelegge 1902,1905) was never completed although manuscripts were in the process of being compiled at the time of Watts' death in 1920; the published lists having dealt only with acrocarpous families.

Further work was continued by Burges (1932, 1935) who prepared but never published a census of New South Wales mosses (1952) which incorporated Watts' manuscript and lists for pleurocarpous families (some 526 species in all).

In 1952 Steere remarked that "Since the Census of New South Wales mosses published by Watts and Whitelegge (1902-1905) no further general work (on Australian mosses) has appeared". It is with the kind permission of Professor Burges, and as a former student of his, that I have much pleasure in being able to complete the project to which so many have contributed. There has been an increase in knowledge of Australian mosses during the last 30 years with Sainsbury's New Zealand Mosses (1955a), Scott and Stone's (1976) Mosses of Southern Australia and Catcheside's (1980) Mosses of South Australia, but details of species distribution and of the sub-tropical species in Australia are still very limited. New South Wales has the most interesting and diverse moss flora in Australia since sub-alpine, arid zone, temperate and tropical species representative of a large percentage of the families of mosses all occur in this region. From an

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estimated 1,100–1,200 taxa in Australia (D.G. Catcheside, pers. comm.), New South Wales has about 44% represented, Queensland about 33%, Victoria and Tasmania both 30%, South Australia 16% and Western Australia only 8%. It is hoped the Census will act as a stimulus for future collecting and taxonomic work.

METHODS

Collections of New South Wales mosses were examined in most Australian Herbaria (AD, BRI, CANB, CBG, HO, NE, NSW, MEL, MELU, SYD, UNSW, UWA) and names and distribution details were obtained for each specimen. The National Herbarium of New South Wales, containing collections of Whitelegge, Forsyth, Watts and others, has been the primary and major source of data for the Census. The distributional data follow the geographical subdivisions used for 'Plants of New South Wales' (Jacobs & Pickard 1981), see map on p.536; within New South Wales these subdivisions are derived from Anderson (1961). As stated in Jacobs & Pickard the "Census serves to indicate the state of the art", and this is true for the mosses where our knowledge is in its infancy. Distributional data, for instance, tell us about where people have collected rather than indicating the true range of the species. Since there has been no bryologist engaged on taxonomic work specifically related to mosses in the National Herbarium of New South Wales since W.W. Watts (1916) (see Ramsay & Briggs 1979) and A. Burges (1952), much is awaiting attention and there are still many unnamed collections.

CRITERIA USED AND ORGANISATION OF DATA

The Census is arranged by families according to Crosby & Magill (1978). Within each family, genera, then species are listed alphabetically. Synonyms appear in the Census and are also listed in a separate index. Taxonomic and nomenclatural changes from literature were included up to the time of going to press, data having been derived from Index Muscorum (Wijk et al. 1959-1969) and supplements from Crosby (1977, 1979, Crosby & Bauer 1981) as well as from published revisions by individual taxonomists (see Bibliography). Name changes in literature have been accepted as relating to the name on the packet unless, or until, the specimen has been examined by an expert or renamed.

It must be stressed that verification has only been possible where specialists have borrowed and checked determinations. The work contains only published names and combinations except in the genus *Macromitrium* for which a revision of Australian species is in manuscript (Vitt & Ramsay) and *Racopilum* under review by van Zanten who has examined all relevant specimens.

A taxon is recorded as present in any region if at least one specimen with that name is available in an Australian herbarium or private collection. Reliability of identification may be questioned where few specimens of a particular taxon have been found and for this reason where collections are for 3 or fewer specimens for a particular area this is indicated. Species records not supported by specimens are listed separately at the end of each genus as 'previous record not substantiated'. *Nomina nuda* which have *not* been accounted for in the synonymy in the Census are treated separately (p.509).

Distribution of taxa in other states of Australia (extra-N.S.W.) is indicated as well as the extra-Australian range. These data are included for convenience but are not necessarily definitive. Within New South Wales, distribution is shown by the ecogeographic regions used by Jacobs & Pickard (1981) based on Anderson (1961). Lord Howe Island species are included since the island is politically part of New South Wales. The distribution also encompasses the Australian Capital Territory (A.C.T.) which is geographically located in the Southern Tablelands Division of New South Wales. Extra-Australian distributions follow the regions named in Jacobs & Pickard (1981) and listed on page 459 here.

The paucity of species and collections within some regions highlights the need for further work and more intensive surveys of distribution. The original data, which include collectors' notes for some 20,000 specimens, will remain available so that lists within regions may be compiled and added to as new collections are made, particularly with a view to increasing our knowledge of ecological preferences for species. Already it is clear that many species have been collected from only a limited area or have a very restricted distribution. Such species should be studied thoroughly and efforts made to determine their true range.

This Census recognises 527 species (not including 22 unsubstantiated records) in 171 genera from 56 families of mosses. A number of infraspecific taxa add to the total species diversity in the area. In all, 81 species are listed as being restricted in distribution to New South Wales (Ramsay 1984a). Although a large number of new records are included e.g. *Drepanocladus uncinatus* at Mt. Kosciusko, *Brachymenium exile*, these have not been highlighted in the list. Relationships between New South Wales species and those in other states of Australia indicate a separation into those sub-tropical species that have been recorded from New South Wales and Queensland only, and those (the majority) with affinities to the temperate bryoflora of southern Australia. Of the sub-tropical species many have been collected only in the MacPherson-Macleay overlap on the border between New South Wales and Queensland. This region is considered as phytogeographically significant for higher plants (Burbidge 1960). A preliminary survey of phytogeographical relationships of the mosses of New South Wales is included separately (Ramsay 1984a). The distributions of mosses within the Australian Capital Territory (Ramsay & Streimann 1984) and on Lord Howe Island (Ramsay 1984b) have also been analysed in separate papers (see pp. 559, 549).

ACKNOWLEDGEMENTS

Financial support from the Australian Biological Resources Study from 1974 to 1979 (incl.) to enable distributional information to be recorded necessitated the complete sorting and repackaging of specimens into a uniform system at the National Herbarium of New South Wales. Without the co-operation of the Director and Staff at the Herbarium in allowing me access at all times and their contribution in repackaging and labelling the collections, the task could not have been completed.

Many others have also assisted freely. The Directors and Staff of various Herbaria (AD, BRI, CANB, CBG, HO, NE, NSW, MEL, MELU, SYD, UNSW, UWA) have helped greatly by making collections and facilities available and supplying information when requested. Dr A. Touw, Rijksherbarium, Leiden, has contributed much time and effort in identifying Streimann's collections from the National Botanic Gardens. Help has also been given by Staff of the British Museum and the V.F. Brotherus Herbarium at Helsinki. Personal thanks to M. Austin, B. Austin, D.G. Catcheside, G. Harden, T. Howard, A. Murray, J. Parram, L. Pedley, G.A.M. Scott, I.G. Stone, H. Streimann and J.H. Willis, who have given me specimens, supplied unpublished lists and/or other information, checked sections of the manuscript, or allowed me access to their private collections. My two assistants, T. Boyd (1976) and P. Wilson (1978), gave invaluable help in sorting, checking and recording data and in collecting and assembling the data for the manuscript. C. Puttock helped with checking, indexing and literature lists. Assistance in reading sections of the manuscript and helpful suggestions given by H. Ando, D.G. Catcheside, T. Koponen, W. Margadant, R. Pursell, G.A.M. Scott, I.G. Stone, D.H. Vitt and B.O. van Zanten are also gratefully acknowledged. Extra distributional data supplied by I.G. Stone were obtained during travel for research projects funded by the Australian Research Grants Committee. The following people examined and checked identification of genera and species of special interest to them — H. Ando, A. Touw, B.O. van Zanten, I.G. Stone, M.A. Bruggemann-Nannenga, J. Lewinsky, D.H. Vitt, T. Koponen, R.D. Seppelt and H. Mohamed.

Their expertise and co-operation proved a most valuable contribution. A. Lonergan, S. Wray, J. Ratcliffe and F. Colman have helped enormously by typing drafts and the final manuscript. The encouragement and patient support of my husband has been of immense help in enabling the work to be completed.

The author accepts full responsibility for any errors or omissions and would appreciate notification of any inaccuracies.

ADDENDA

One species of *Archidium* Brid. (Archidiaceae) has now been found in New South Wales (I.G. Stone, pers. comm.).

I.G. Stone (pers. comm.) reports the following new records for New South Wales. Details to be published later.

Bruchia eckloniana C. Muell. — NWS; V; S Afr

Ephemerum rehmannii (C. Muell.) Broth. — SFWP; VSW

Tortula rhizophylla (Sak.) Iwats. & Saito — CC; Q; S Afr

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ABBREVIATIONS AND SYMBOLS USED IN TABLE 1

Distribution within New South Wales

LHI	Lord Howe Island	FWP	Far Western Plains
C	Coast	N	North
T	Tablelands	C	Central
WS	Western Slopes	S	South
WP	Western Plains	NSW	New South Wales

● present in the subdivision > 3 collections
o no sighted or cited specimen from the subdivision
? specimen or cited locality inadequate for reliable record; in the extra-NSW column of Table 1 the "?" precedes the abbreviation for the state to which the doubtful record applies.
★ number of specimens ≤ 3

Extra-New South Wales Distribution

Q — Queensland, V — Victoria, T — Tasmania, Y — Northern Territory, S — South Australia, W — Western Australia, A — Australian Capital Territory (included separately here although it lies within the geographical boundaries of N.S.W. [see Ramsay & Streimann 1984] as it is a political entity)

Extra-Australian Distribution

N	North, northern or New	Malesia	The Malay Peninsula, Philippines, Malaysia, Indonesia and New Guinea, a phytogeographic not a political region
S	South, southern		
E	East, eastern		
W	West, western		
C	Central	Medit	Mediterranean region
cosmop	cosmopolitan	N Caled	New Caledonia
Afr	Africa	NG	New Guinea
Amer	America	NZ	New Zealand
As	Asia	Subant I	Subantarctic Islands
Eur	Eur	Oc	Oceania
I	Island or Islands	Pac	Pacific
		Philip	Philippines

TABLE 1. DISTRIBUTION AND CHECKLIST OF MOSSES OF NEW SOUTH WALES.
(Families arranged according to Crosby & Magill 1981.) For index to genera and families see p. 532.

o absent ● > 3 collections ★ ≤ 3 collections

1. SPHAGNACEAE	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
SPHAGNUM L.																
S. australe Mitt. [*S. antarcticum* Mitt., *S. perichaetiale* Warnst.]	o	o	o	o	o	●	o	o	o	o	o	o	o	o	VT	NZ, S Amer, S Afr
S. beccarii Hampe [*S. erythrocalyx* auct. non Hampe]	o	●	o	o	o	●	o	o	o	o	o	o	o	o	V	SE As, Afr, Amer
S. cristatum Hampe [*S. decipiens* Warnst., *S. grandifolium* Warnst, *S. magellanicum* Brid., *S. subbicolor* Hampe, *S. wardellense* Warnst.]	o	●	●	o	●	●	●	o	o	o	o	o	o	o	QVTA	NZ
S. falcatulum Besch. [*S. brotherussii* Warnst., *C. cuspidatum* Erh. ex Hoffm., *S. drepanocladum* Warnst., *S. serratifolium* Warnst., *S. wattsii* Warnst.]	o	●	★	★	o	★	o	o	o	o	o	o	o	o	QVTA	NZ, S Amer, Subant I
S. molliculum Mitt.† [*S. commutatum* Warnst., *S. cymbifolioides* C. Muell., *S. comosum* C. Muell., *S. novo-zealandicum* Mitt., *S. pseudorufescens* Warnst., *S. subcontortum* Hampe, *S. subsecundum* auct. non Nees]	o	●	●	●	o	●	★	o	o	o	o	o	o	o	VTSWA	
2. ANDREAEACEAE																
ANDREAEA Hedw.																
A. australis Mitt.	o	o	o	o	o	o	●	o	o	o	o	o	o	o	VTA	NZ
A. mutabilis Hook. f. & Wils. [*A. amblyophylla* C. Muell. ex Broth., *A. rupestris* auct. non Hedw.]	o	o	o	o	o	●	●	o	o	o	o	o	o	o	QVTA	Cosmop
A. nitida Hook f. & Wils.	o	o	o	o	o	o	★	o	o	o	o	o	o	o	VTA	NZ, NG, Afr, S Amer, Subant I

†See Catcheside 1980.

A. subulata Har. ex Hook. [*A. subulatissima* C. Muell.]	○	○	○	○	●	●	●	○	○	○	○	○	○	○	VT	NZ. Afr. S Amer. Borneo. As. Subant I
A. tenera C. Muell.	○	○	○	○	○	●	○	○	○	○	○	○	○	○		

3. FISSIDENTACEAE

FISSIDENS Hedw.																
F. amblyothallioides Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
F. anisophyllus Dix.	○	○	○	○	★	○	○	○	○	○	○	○	○	○		NZ
F. arboreus Broth.	●	●	★	○	○	●	○	○	○	○	○	○	○	○	Q	N Caled
F. arcuatulus Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
F. aristatus Broth.	○	★	●	●	○	○	○	○	○	○	○	○	○	○		
F. asplenioides Hedw.	○	●	●	★	●	●	●	★	★	★	○	○	○	○	QVTYS-WA	Cosmop (excl. Oc)
F. australiensis Jaeg.	○	○	★	○	○	●	○	○	○	○	○	○	○	○	V	
F. basilaris C. Muell. & Hampe	○	○	○	○	★	○	○	○	○	○	○	○	○	○	S	
F. bryoidioides Broth.	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
F. calodictyon Broth.	○	●	★	○	○	○	○	○	○	○	○	○	○	○	Q	
F. cambewarrae Dix.	○	○	★	○	○	○	○	○	○	○	○	○	○	○	Q	
F. crassipes Wils. ex B.S.G. [*F. dietrichiae* C. Muell., *F. praemollis* Broth.]	○	★	★	★	○	★	★	○	○	○	○	○	○	○	VTSA	Eur. As. Afr. N Amer
F. dealbatus Hook. f. & Wils.	○	●	★	★	○	○	○	○	○	○	○	○	○	○	VT	NZ. Fiji. Oc
F. fontanus (Pyl.) Steud. [*F. muelleri* (Hampe) Mitt.]	●	●	●	○	●	○	○	○	★	●	○	○	○	○	QVTS	Cosmop
F. forsythii Broth.	○	★	○	○	○	★	○	○	○	○	○	○	○	○		
F. homomallulus C. Muell. ex Dix.	○	●	●	○	○	○	○	○	○	○	○	○	○	○		
F. howeanus Broth. ex Whitel.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
F. humilis Dix. & Watts	○	●	●	★	○	★	★	○	○	○	○	★	○	○	QVYA	NZ
F. leptocladus C. Muell. ex Rodway	○	★	★	★	★	★	●	○	○	●	○	○	○	○	QVTS-WA	NZ
F. longigulatus Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
F. montecollii Broth. & Watts	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
F. oblongifolius Hook.f. & Wils.	○	●	●	○	○	●	○	○	○	★	○	○	○	○	QVTS	NZ

3. FISSIDENTACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
FISSIDENS (cont'd)																
F. pallidus Hook. f. & Wils. [*F. whiteleggei* C. Muell. ex Rodway]	○	●	●	●	○	●	○	○	○	○	○	○	○	○	QVT	NZ
F. pungens C. Muell. & Hampe	○	●	●	●	★	●	●	○	●	○	○	○	○	○	QVTYS-WA	NZ
F. rigidulus Hook. f. & Wils. ssp. **rigidulus**	○	★	★	★	★	★	●	○	★	○	○	○	○	○	VTA	NZ, C&S Amer, NG, Solomon I
F. sordidevirens Broth.	○	●	★	○	○	○	○	○	○	○	○	○	○	○		
F. subtenellus Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
F. taylorii C. Muell. [*F. brevifolius* Hook. f. & Wils., *F. elamellosus* C. Muell. & Hampe, *F. macrodus* Hampe, *F. semilimbatus* C. Muell. & Hampe]	○	★	●	●	●	●	●	★	●	●	○	○	★	○	VTSWA	NZ
F. tenelliformis Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
F. tenellus Hook. f. & Wils.	●	●	●	○	○	★	★	○	○	○	○	○	○	○	QVTSA	NZ
F. vittatus Hook. f. & Wils.	○	★	★	○	★	★	●	○	●	●	○	○	●	○	VTSWA	NZ, S Afr
F. wattsii Broth.	●	○	●	○	○	○	○	○	○	○	○	○	○	○		
[Previous record not substantiated: *F. ampliretis* (C. Muell.) Broth., *F. delicatulus* (Aongstr.) Watts & Whitel., *F. perangustatus* Broth.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
5. DITRICHACEAE																
CHRYSOBLASTELLA Williams																
C. chilensis (Mont.) Reim. [*Cheilothela chilensis* (Mont.) Broth.]	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VT	S Amer
CERATODON Brid.																
C. purpureus (Hedw.) Brid. [*C. convolutus* Reichdt., *C. stenocarpus* Bruch. & Schimp. ex C. Muell.]	●	●	●	●	●	●	●	●	●	●	●	○	●	●	QVTYS-WA	Cosmop
DISTICHIUM B.S.G.																
D. capillaceum (Hedw.) B.S.G.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	A	N Hemis, NZ

DITRICHUM Hampe																
D. brachycarpum Hampe	○	○	★	○	○	★	★	○	○	○	○	○	○	○	V	NZ. Subant I
D. brevirostre (R. Br. ter.) Broth.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VT	NZ. Subant I
[*D. subbrachycarpum* (C. Muell.) Par.]																
D. cylindricarpum (C. Muell.) F. Muell.	○	●	●	●	●	●	●	●	●	●	○	○	○	○	VTSA	NZ
[*D. elongatum* (Hook. f. & Wils.) Mitt., *D. strictum* (Hook. f. & Wils.) Hampe]																
D. difficile (Dub.) Fleisch.	○	●	●	●	●	●	●	●	●	●	○	○	○	○	QVTSA	NZ. As. S Afr. N&S Amer
[*D. affine* (C. Muell.) Hampe. *D. baileyi* C. Muell. *nom. nud.*, *D. flaccidulum* C. Muell. in Watts & Whitel., *D. flexifolium* Hampe, *D. muelleri* (Hampe) Hampe. *D. setosum* (Hook. f. & Wils.) Reichdt.]																
D. punctulatum Mitt.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VT	NZ. S Afr. Subant I
D. rufo-aureum (Hampe) Willis	○	○	○	○	○	○	●	○	○	★	○	○	○	○	V?T	NZ
[*Tongstroemia rufo-aurea* Hampe]																
ECCREMIDIUM Wils.																
E. arcuatum (Hook. f. & Wils.) C. Muell.	○	○	○	○	○	○	○	★	●	○	○	★	○	○	QVSW	
E. brisbanicum (Broth.) Stone & Scott	○	●	●	●	○	★	○	○	○	○	○	○	○	○	Q	
[*Archidium brisbanicum* (Broth.) Broth., *Micromitrium brisbanicum* (Broth.) Crosby. *Nanomitrium brisbanicum* (Broth.) Broth., *Pleuridium austro-subulatum* Broth. ex Roth.]																
E. exiguum (Hook. f. & Wils.) Wils.	○	○	★	○	○	○	○	○	★	○	○	○	○	○	VW	S Afr
E. minutum (Mitt.) Stone & Scott	○	○	●	○	○	○	○	○	★	○	○	○	○	○	VW	S Afr
[*Ephemerum whiteleggei* Broth. & Geh., *Bruchia whiteleggei* C. Muell., *Sporledera whiteleggei* (C. Muell.) Broth.]																
E. pulchellum (Hook. f. & Wils.) C. Muell.	○	○	●	○	★	○	●	○	●	★	●	○	●	○	QVTYS-WA	NZ
[*Archidium stolonaceum* C. Muell.]																
E. whiteleggei Broth.	○	○	●	○	○	○	○	○	○	○	○	○	○	○	W	NZ
[*Sporledera minutissima* (Dix. & Sainsb.) Sainsb.]																
PLEURIDIUM Rabenh.																
P. arnoldii (R. Br. ter.) Par.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VA	NZ
P. brachycaulon (C. Muell.) Kindb.	○	○	●	○	○	○	○	●	○	○	○	○	○	○	V	
P. curvisetum Stone	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
P. krauseanum Par.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VSA	

5. DITRICHACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
PLEURIDIUM (cont'd)																
P. nervosum (Hook.) Mitt. [*P. gracilentum* (Mitt.) Mitt.]	○	●	●	●	●	●	●	●	●	●	●	●	●	●	VTYS-WA	NZ, S Afr, S Amer
P. viride (C. Muell.) Kindb. [*Astomum viride* C. Muell.]	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
7. SELIGERIACEAE																
BLINDIA B.S.G.																
B. magellanica Schimp.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VT	NZ, S Amer, Subant I
B. robusta Hampe [*B. tenuifolia* (Hook. f. & Wils.) Mitt.]	○	○	○	○	○	●	●	○	○	○	○	○	○	○	VTA	NZ, S Amer
8. DICRANACEAE																
BRUCHIA Schwaegr.																
B. brevipes Harv. ex Hook.	○	★	○	○	○	○	★	○	○	★	○	★	○	○	VSW	S Afr, NG
CAMPYLOPUS Brid.																
C. austro-subulatus Broth. & Geh.†	○	○	○	○	○	○	★	○	○	○	○	○	○	○	QVSA	
C. bicolor (C. Muell.) Wils.	○	★	●	★	○	●	★	○	○	★	○	○	○	○	QVTSW	NZ, Afr
C. clavatus (R. Brown) Wils. [*C. appressifolius* Mitt *C. institus* Hook. f. & Wils.]	●	●	●	★	★	●	●	★	●	★	○	○	○	○	Q?VTS-WA	NZ, Afr, S Amer
C. dentieuspis Broth. var. **lutescens** Broth.	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
C. introflexus (Hedw.) Brid. [*C. pudicus* (C. Muell.) Jaeg., *C. tasmanicus* Par.]	●	●	●	●	★	●	●	★	●	●	●	○	●	○	QVTY-?SWA	Cosmop
C. pallidus Hook. f. & Wils. [*C. novae-valesiae* Broth, *C. torquatus* Mitt., ? *C. woollsii* (C. Muell,) Par.]	●	●	●	●	○	●	●	○	●	○	○	○	○	○	QVTS-W?A	NZ
C. peraurieulatus Broth.	○	●	○	?★	○	○	○	○	○	○	○	○	○	○		
C. viridicatus (C. Muell.) Par.	○	○	★	○	○	○	○	○	○	○	○	○	○	○	Q	

†Under review by Frahm & Catcheside — probably a new species as Australian populations do not match the New Guinea forms (Catcheside pers. comm.).

DICNEMOLOMA (Ren.) Ren.‡																
D. pallidum (Hook.) Wijk & Marg.	●	●	●	●	●	●	●	★	★	★	○	○	○	○	QVTYS-	NZ
[*D. sieberianum* (Hornsch.) Broth., *Leucoloma sieberianum* (Hornsch.) Jaeg., *Sclerodontium pallidum* Hook.]																
[Previous record not substantiated: *D. fraseri* (Mitt.) Ren., *D. imbricatum* Broth. & Geh., *D. strictipilum* (C. Muell.) Par.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
DICRANELLA (C. Muell.) Sehimp.																
D. apophysatula (C. Muell.) Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
D. cardotii (R. Br. ter.) Dix.	○	●	★	○	○	○	★	○	○	○	○	○	○	○	T	NZ
[*D. wattsii* Broth., *Dichodontium wattsii* (Broth.) Broth.]																
D. dietrichiae (C. Muell.) Jaeg.	○	●	●	○	★	●	○	○	○	○	○	○	○	○	QVT	
[*D. tricruris* (C. Muell.) Mitt.]																
D. jamesonii (Mitt.) Broth.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTS	NZ, S Amer
[*Anisothecium jamesonii* Mitt.]																
D. pycnoglossa (Broth.) Kindb.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
[*Anisothecium pycnoglossum* Broth.]																
[Previous record not substantiated: *D. stackhousiana* (C. Muell.) Broth., *Longstroemia stackhousiana* C. Muell.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
DICRANOLOMA Ren.																
D. argutum (Hampe) Par.	○	●	●	★	○	●	○	○	○	○	○	○	○	○	Q	
[*Dicranum whiteleggei* C. Muell.]																
D. austro-scoparium (Broth.) Watts & Whitel.	○	○	★	○	○	★	○	○	○	○	○	○	○	○	Q	
[*Leucoloma austro-scoparium* C. Muell. ex Broth.]																
D. billardieri (Brid.) Par.	★	●	★	○	★	●	●	○	○	○	○	○	○	○	QVTSA	NZ, Afr, S Amer
D. dicarpum Nees Par.	●	●	●	★	●	●	●	○	★	○	○	○	○	○	QVTA	NZ, SE As
[*Dicranum dicarpum* (Nees), *Leucoloma dicarpum* (Nees) Broth.]																
D. menziesii (Tayl.) Par.	●	●	●	○	●	●	★	○	○	○	○	○	○	○	QVT	NZ, Oe, S Amer
D. robustum (Hook. f. & Wils.) Par. var. **setosum** (Hook. f. & Wils.) Sainsb.	○	○	★	○	★	●	●	○	○	○	○	○	○	○	A	NZ
D. serratum (Broth.) Par.	○	●	●	○	○	●	○	○	○	○	○	○	○	○	Q	
[*Leucoloma serratum* Broth.]																
D. sullivanii (C. Muell.) Par.	○	○	○	○	★	○	★	○	○	○	○	○	○	○	V	
[*Dicranum sullivanii* C. Muell.]																

‡Retained here as *Dicnemoloma* although Crosby (pers. comm.) and Crosby & Magill (1981) point out this name is preceded by *Sclerodontium*.

8. DICRANACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
DICRANUM Hedw.																
D. bonjeanii De Not. [*D. scoparium* Hedw. ssp. *bonjeanii* (De Not.) Grout.]	○	○	○	○	○	○	●	○	○	○	○	○	○	○		Eur, As, N Amer
HOLOMITRIUM Brid.																
H. perichaetiale (Hook.) Brid. [*H. hodgkinsoniae* C. Muell., *H. muelleri* Hampe, *H. whiteleggei* C. Muell. *pro syn.*, *? H. dietrichiae* C. Muell.]	●	●	●	★	○	●	○	○	○	○	○	○	○	○	QVT	NZ, N Caled, Subant I
H. perichaeteale (Hook.) Brid. var **robustum** Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
LEUCOLOMA Brid.																
L. leichhardtii (Hampe) Jaeg.	○	○	★	○	★	○	○	○	○	○	○	○	○	○	QV	
TREMATODON Michx.																
T. amoenum (C. Muell.) Stone & Scott [*Bruchia amoena* C.Muell.]	○	○	○	○	○	●	○	○	○	○	○	○	○	○	VA	
T. flexipes Mitt. [*T. alpinus* J.H. Willis]	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTA	NZ, Subant I
T. longeseens C. Muell.	○	●	★	○	○	○	○	○	○	○	○	○	○	○	Q	
T. mackayi (R. Br. ter.) Broth.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTA	NZ
T. suberectus Mitt. [*T. adaequans* Geh. ex Roth, *T. abruptus* Watts & Whitel.]	○	●	●	○	○	○	○	○	○	○	○	○	○	○		NZ
9. DICNEMONACEAE																
EUCAMPTODON (Mont.) Mont.																
E. muelleri Hampe & C. Muell.	○	●	●	●	●	●	○	○	○	○	○	○	○	○	QV	
11. LEUCOBRYACEAE																
LEUCOBRYUM Hampe																
L. ballinense Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	

L. candidum (P. Beauv.) Wils.	●	●	●	●	●	●	●	○	○	○	○	○	○	○	QVTW	NZ, Oc
[*L. brachyphyllum* Hampe. *L. teysmannianum* Dozy & Molk.. *L. strictifolium* Broth.]																
L. candidum (P. Beauv.) Wils. var. **pentastichum** (Dozy & Molk.) Dix.	●	●	●	○	★	●	○	○	○	○	○	○	○	○		NZ
[*L. spirostichum* C. Muell. in Mitt. *nom. nud.*, *L. speirostichum* C. Muell. in Geh. *nom. nud.*]																
L. subchorophyllosum Hampe	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
L. turgidulum C. Muell.	○	○	○	○	○	★	○	○	○	○	○	○	○	○		
L. wattsii Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	

12. CALYMPERACEAE

CALYMPEROPSIS (C. Muell.) Fleisch.																
C. wattsii (Broth.) Fleisch. [*Syrrhopodon wattsi* Broth.]	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
SYRRHOPODON Schwaegr.																
S. fimbriatulus C. Muell.	○	●	●	●	○	○	○	○	○	○	○	○	○	○	Q	
S. incompletus Schwaegr. [*Calymperes armatum* Broth.]	○	○	★	○	○	○	○	○	○	○	○	○	○	○		N&S Amer
S. novae-valesiae C. Muell.	○	●	●	○	○	○	○	○	○	○	○	○	○	○	Q	
S. platyceri Mitt.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		Afr

13. ENCALYPTACEAE

ENCALYPTA Hedw.																
E. vulgaris Hedw.	○	●	○	●	●	●	●	●	●	●	○	○	○	○	VTSA	NZ, As, N Amer, Afr
[*E. australis* Mitt., *E. tasmanica* Hampe]																
[Previous record not substantiated: *E. novae-valesiae* Hampe]	○	○	○	○	○	○	○	○	○	○	○	○	○	○	V	

14. POTTIACEAE	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
ACAULON C. Muell.																
A. chrysaeanthum Stone	○	○	○	○	○	○	○	○	○	○	○	★	★	●	VS	
A. crassinervium C. Muell. [*Phascum tasmanicum* Dix. & Rodw.]	○	○	○	○	○	○	○	○	★	★	○	○	●	○	VTSW	
A. integrifolium C. Muell. [*A. austro-muticum* Geh. ex Roth, *A. sullivanii* C. Muell., *Phascum apiculatum* Hook. f. & Wils.]	○	★	●	★	★	★	★	○	●	○	○	○	★	○	QVTS-WA	NZ
A. leucochaete Stone	○	○	○	○	○	○	○	○	○	○	○	★	●	●	VSW	
A. robustum Broth. ex Roth	○	○	○	○	★	○	○	○	●	○	○	●	★	○	VSY	
A. triquetrum (Spruce) C. Muell.	○	○	○	○	○	○	○	○	○	○	○	○	●	★	VSW	Eur, N Afr, N Amer
ALOINA Kindb.																
A. aloides (Schutz) Kindb. var. **ambigua** (B.S.G.) Craig [*A. ambigua* (B.S.G.) Limpr.]	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VSW	NZ, ?(N Amer, Eur, S Afr)
A. sullivaniana (C. Muell.) Broth. [*Tortula sullivaniana* (C. Muell.) Watts & Whitel.] (? = **A. bifrons** (De Not.) Delgadillo)	○	○	○	○	○	○	○	●	★	○	★	○	○	○	VS	NZ
BARBULA Hedw.																
B. acrophylla C. Muell.	○	○	○	★	○	○	○	○	○	○	○	○	○	○	V	
B. australasiae (Hook. & Grev.) Brid. [*Trichostomopsis australasiae* (Hook. & Grev.) Robinson]	○	○	○	★	★	○	★	★	○	★	○	○	○	○	VTSW	NZ, S Afr, S Amer
B. calycina Schwaegr. [*Tortella calycina* (Schwaegr.) Dix. *Tortula calycina* (Schwaegr.) Hook. & Grev.]	●	●	●	★	○	★	●	●	●	★	○	○	★	○	QVTYS-WA	NZ, S Amer
B. chlorotricha (Broth. & Geh.) Par. [*Tortula chlorotricha* Broth. & Geh.]	○	○	●	★	○	○	●	○	●	○	○	○	○	○	V	
B. crinita Schultz [*B. pseudopilifera* C. Muell. & Hampe, *B. pilifera* (Hook.) Brid. *nom. illeg.*, *Tortula flavinervis* Dix., *T. pungens* Hook. f. & Wils. *nom. illeg.*]	○	★	★	★	○	★	●	★	★	○	○	★	○	★	VTSWA	NZ, Afr, S. Amer
B. hornschuchiana Schultz [*Desmatodon adustus* Mitt., *Barbula subspiralis* Hampe]	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTSWA	Eur, SW As, Afr

B. speirostega C. Muell.	○	○	○	○	○	★	○	○	○	○	○	○	○	○		
B. subcalycina C. Muell.	○	●	●	★	○	○	○	○	○	○	○	○	○	○	VSW	
[*Tortula subcalycina* (C. Muell.) Mitt.]																
B. torquata Tayl.	○	○	●	○	○	★	●	○	●	★	★	★	●	●	VTYSW-A	NZ, S Amer
[*Tortula torquata* (Tayl.) Wils.]																
B. unguiculata Hedw.	○	○	●	●	★	○	★	○	○	○	○	○	○	○	VSTA	Cosmop
[*Tortula acuminata* Brid. *nom. illeg.*]																
BRYOERYTHROPHYLLUM Chen.																
B. rotundatum (Lindb. & Arn.) Chen.	○	○	★	○	○	○	○	○	○	○	○	○	○	○		As
[*Barbula rotundata* Lindb. & Arn..																
Didymodon rotundatus (Lindb. & Arn.) Par.]																
B. jamesonii (Tayl.) Crum.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTWA	NZ
[*B. binnsii* (R. Br. ter.) Wijk & Marg.]																
CALYPTOPOGON (Mitt.) Broth.																
C. mnioides (Schwaegr.) Broth.	○	○	○	○	●	●	●	○	○	○	○	○	○	○	VTS	NZ, S Amer
CROSSIDIUM Jur.																
C. davidai Catcheside	○	○	○	○	○	○	○	○	○	○	○	○	★	★	S	
C. geheebii (Broth.) Broth.	○	○	○	○	○	○	○	○	○	○	★	○	○	★	VYSW	NZ
DESMATODON Brid.																
D. convolutus (Brid.) Grout.	○	○	●	○	●	★	●	★	●	●	●	●	●	★	QVYS-WA	Cosmop
[*Tortula atro-virens* (Sm.) Lindb.,																
Barbula atro-virens (Sm.) Schimp.,																
Pottia brachyodus (Hampe) Jaeg.]																
D. recurvatus (Hook.) Mitt.	○	○	○	○	★	○	●	○	○	○	○	○	○	○	VSA	S Afr
DIDYMODON Hedw.																
D. wildii (Broth.) Broth.	○	○	○	○	○	○	○	○	○	○	★	○	○	○		
GYMNOSTOMUM Nees & Hornsch.																
G. aeruginosum (Sm.) Zander	○	★	●	●	○	★	●	●	★	★	○	○	○	○	QVTS-WA	Cosmop
[*G. calcareum* Nees & Hornsch.]																
HYMENOSTOMUM R. Br.																
H. olivaceum C. Muell. ex Geh.	○	●	●	○	★	★	○	●	○	○	○	○	○	○		
H. sullivanii C. Muell. ex Geh.	○	○	○	○	★	○	○	○	★	○	○	○	○	○		
LEPTODONTIUM (C. Mucll.) Hampe ex Lindb.																
L. viticulosoides (P. Beauv.) Wijk & Marg.	○	○	○	○	★	○	○	○	○	○	○	○	○	○	Q	As, Afr, C Amer
[*Trichostomum subdenticulatum* C. Muell.]																
L. paradoxum Stone & Scott	○	○	○	○	○	★	○	○	○	○	○	○	○	○	VSWA	
[*L. interruptum* (Mitt.) auct. non Broth.]																

14. POTTIACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
POTTIA (Reichenb.) Fuernr.																
P. brevicaulis (Tayl.) C. Muell.	○	○	○	○	○	○	○	○	●	○	○	○	○	○	VSW	
P. drummondii (Wils.) J.H. Willis	○	○	○	○	○	○	○	○	★	○	○	○	○	○	Q?VTS-W	
P. starckeana (Hedw.) C. Muell.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VSA	NZ, N Afr. Eur, As, N Amer
P. truncata (Hedw.) B.S.G.	○	○	★	○	○	○	●	○	○	○	○	○	○	○	VTSA	Cosmop
PTERYGONEURUM Jur.																
P. kemsleyi J.H. Willis	○	○	○	○	○	○	○	○	○	○	○	○	○	★	VSW	
P. ovatum (Hedw.) Dix.	○	○	○	○	○	○	○	○	○	○	○	○	★	★	VSW	Eur, N Afr, As, N Amer
TETRAPTERUM Hampe ex Jaeg.																
T. cylindricum (Tayl.) Jaeg. [*Astomum cylindricum* (Tayl.) Mitt.]	○	○	○	○	●	★	★	●	●	★	○	○	★	○	QVTYS-WA	
T. sullivanii (C. Muell.) Broth. [*Phascum sullivanii* C. Muell. — known only from type in BM]	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
TORTELLA (Lindb.) Limpr.																
T. cirrhata Broth. [*T. subflavovirens* Broth. & Watts]	●	○	○	●	○	○	○	○	○	●	○	○	○	○	VSW	
T. knightii (Mitt.) Broth. [*T. nano-tortuosa* (C. Muell.) Watts & Whitel.]	○	●	●	○	○	○	●	○	●	○	○	○	○	○	VT	NZ
T. novae-valesiae Broth.	○	★	★	○	○	○	○	○	○	○	○	○	○	○		
TORTULA Hedw.																
T. evanescens Broth.	○	○	○	○	○	○	○	○	★	○	○	○	○	○		
T. laevipila (Brid.) Schwaegr.	○	○	○	○	○	○	★	○	★	○	★	○	○	○		Cosmop
T. muralis Hedw. [*T. austro-muralis* (C. Muell.) Broth. ex Par., *T. melbourneana* (C. Muell.) Broth.]	○	★	●	○	★	●	●	○	○	○	○	○	○	○	VTSWA	Cosmop
T. oleaginosa Stone	○	○	○	○	○	○	○	○	○	○	○	○	●	★	VSW	
T. pagorum (Milde) de Not. [*T. baileyi* auct. non Broth.]	●	●	●	★	●	○	○	○	●	★	○	○	○	★	QVTSW	Eur, N Amer
T. panduraefolia (C. Muell. & Hampe) Broth.	○	○	●	○	★	★	★	★	★	○	★	○	○	○		
T. papillosa Wils.	○	○	★	★	★	★	●	○	●	★	○	○	○	○	QVTS-WA	Cosmop

T. princeps De Not.†	○	○	★	★	●	●	●	★	●	●	○	★	○	★	VTSWA	Cosmop
T. readeri (C. Muell.) Broth.	○	○	○	○	○	○	○	★	○	○	○	○	○	○		
T. rubra Mitt.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VA	NZ, S Amer, Subant I
T. streptopogoniacea (C. Muell.) Broth.	○	★	○	○	○	●	○	★	○	○	○	○	○	○		
T. subbrunnea Broth. & Watts	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
T. vesiculosa (C. Muell.) Broth.	○	○	●	○	●	●	★	○	●	●	○	○	○	○		
[Previous record not substantiated:	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
T. crawfordii (Par.) Watts in Watts & Whitel.,																
T. asperifolia Broth.,																
T. parramattana Mitt.,																
Barbula parramattana (Mitt.) Kindb.]																
TRACHYCARPIDIUM Broth.																
T. brisbanicum (C. Muell.) Stone	○	★	●	○	○	○	○	○	○	○	○	○	○	○	Q	
[*Astomum brisbanicum* (C. Muell.) Broth.,																
A. wattsii Broth. ex Roth]																
TRICHOSTOMUM Bruch.																
T. aristatulum Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
TRIDONTIUM Hook. f. in Hook.																
T. tasmanicum Hook. f.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VT	NZ, As
TRIQUETRELLA C. Muell.																
T. papillata (Hook. f. & Wils.) Broth.	○	○	●	★	★	●	●	★	●	●	○	○	○	○	VTSWA	NZ
T. richardsiae C. Muell.	○	○	○	○	○	○	○	○	○	○	★	○	○	○	S	
WEISSIA Hedw.																
W. controversa Hedw.	●	●	●	●	●	●	●	★	●	★	★	○	★	○	QVTYSA	Cosmop
[*W. flavipes* Hook. f. & Wils.,																
W. truncata C. Muell. *nom. nud.*]																
W. novae-valesiae (Broth. ex Roth) Stone	○	○	●	○	○	○	★	○	○	○	○	○	○	○	A	
[*Astomum novae-valesiae* Broth. ex Roth]																
W. perpusilla (C. Muell.) Stone	○	○	★	○	○	○	○	○	○	○	○	○	○	○		

†NSW collections of this species examined by Kramer (pers.comm.) include *T. andersonii*, *T. antarctica*, *T. rubella*, and *T. leucostega* as well as *T. princeps*.

14A. BRYOBARTRAMIACEAE	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
BRYOBARTRAMIA Sainsb.																
B. novae-valesiae (Broth.) Stone	○	○	○	○	○	○	●	○	●	●	○	○	○	○	VSWA	S Afr
[*Trachycarpidium novae-valesiae* Broth., *Bryobartramia robbinsii* Sainsb.]																
15. GRIMMIACEAE																
GRIMMIA Hedw.																
G. donniana Sm.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	A	Cosmop
[*G. alpestris* Sommerf.]																
G. laevigata (Brid.).Brid.	●	●	●	★	●	●	●	●	●	●	●	○	○	●	QVTS-WA	Cosmop
[*G. leiocarpa* Tayl., *G. leucophaea* Grev., *G. campestris* Burchell ex Hook.]																
G. obtusata (C. Muell. & Hampe Jaeg.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		NZ
G. pulvinata (Hedw.) Sm. var. **africana** (Hedw.) Hook. f. & Wils.	●	●	●	★	⊙	●	●	●	●	●	●	○	★	○	QVTS-WA	Cosmop
[*G. cygnicolla* Tayl., *G. pulvinata* (Hedw.) Sm. var. *obtusa* (Brid.) Hueb.]																
G. trichophylla Grev.	○	○	○	○	○	★	●	○	○	★	○	○	○	○	QVTS-WA	Cosmop
RACOMITRIUM Brid.																
R. aciculum Dix.	★	○	○	○	○	○	○	○	○	○	○	○	○	○		
[specimen in E (Dixon 1950)]																
R. amoenum (Broth.) Par.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	V	
R. crispulum (Hook. f. & Wils.) Hook. f. & Wils.	○	○	○	○	●	★	●	○	○	○	○	○	○	○	QVTWA	S Hemis, C Amer
[*R. sullivanii* (C. Muell.) Broth., *R. symphodon* Jaeg.]																
R. lanuginosum (Hedw.) Brid. var. **pruinosum** Wils.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VT	NZ, S Afr
R. pseudo-patens (C. Muell.) Par.	○	○	○	○	○	○	●	○	○	○	○	○	○	○		
SCHISTIDIUM Brid.																
S. apocarpum (Hedw.) B.S.G.	○	★	●	●	★	●	●	●	★	★	○	○	○	○	QVTS-WA	Cosmop
[*Grimmia apocarpa* Hedw. *nom. inval.*, *G. mutica* Hampe]																
S. rivulare (Brid.) Podp. ssp. **rivulare**	○	○	○	○	○	○	★	○	○	○	○	○	○	○		NZ, N Hemis
[*Grimmia flexifolia* Hampe — specimen in BM (Bremer 1980)]																

16. GIGASPERMACEAE

GIGASPERMUM Lindb.																
G. repens (Hook.) Lindb.	○	○	●	●	●	●	●	●	●	○	●	●	●	○	VTYSW-A	NZ, S Afr

18. EPHEMERACEAE

EPHEMERUM Hampe																
E. cristatum (Hook. f. & Wils.) C. Muell.	○	○	●	○	○	○	○	○	●	●	○	○	★	○	VTSW	

19. FUNARIACEAE

FUNARIA Hedw.																
F. apophysata (Tayl.) Broth.	○	○	●	○	★	★	★	●	●	★	○	○	★	○	QVTYS-WA	NZ
[*Entosthodon apophysata* (Tayl.) Mitt.]																
F. aristata Broth.	○	●	●	●	●	★	○	●	●	●	○	○	○	○	V	
[*Entosthodon aristatus* (Broth.) Par.]																
F. cuspidata Hook. f. & Wils.	○	●	●	○	○	○	○	○	○	○	○	○	○	○	QVTSW	NZ
F. glabra Tayl.	○	●	●	●	●	●	●	●	●	●	○	○	★	○	QVTYS-WA	NZ, N Caled
[*F. crispula* Hook. f. & Wils., *F. tasmanica* C. Muell. & Hampe, *F. subnuda* Tayl.]																
F. gracilis (Hook. f. & Wils.) Broth.	○	★	●	○	○	○	●	●	○	★	○	○	★	○	VTYSW-A	NZ
[*Entosthodon gracilis* Hook. f. & Wils.]																
F. helmsii Broth. in Geh.	○	○	○	○	○	○	○	○	○	○	○	○	★	○	VTYSW	
F. hygrometrica Hedw.	●	●	●	●	●	●	●	●	●	○	○	○	○	★	QVTYS-WA	Cosmop
[*F. calvescens* Schwaegr., *F. hygrometrica* Hedw. var. *sphaerocarpa* C. Muell., *F. sphaerocarpa* C. Muell.]																
F. smithhurstii Broth. & Geh.	○	●	●	○	○	○	○	○	★	○	○	○	○	○	QV	
[*Entosthodon smithhurstii* (Broth. & Geh.) Par.]																
F. squarrifolia Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
[*Entosthodon squarrifolius* (Broth.) Par.]																
GONIOMITRIUM Hook. f. & Wils.																
G. acuminatum Hook. & Wils.	○	○	●	○	○	○	●	○	●	○	○	○	★	○	QYSWA	NZ
G. enerve Hook. & Wils.	○	○	●	○	★	○	○	★	●	○	★	○	★	○	VSWA	

19. FUNARIACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
PHYSCOMITRELLA B.S.G.																
Physcomitrella readeri (C. Muell.) Stone & Scott	○	○	○	○	○	○	○	○	○	○	○	○	★	○	VS	
[*P. patens* (Hedw.) B.S.G. var *readeri* (C. Muell.) Tan]																
PHYSCOMITRIUM (Brid.) Fuernr.																
P. brisbanicum C. Muell.	○	●	★	○	○	○	○	○	○	○	○	○	○	○	Q	
P. integrifolium Hampe & C. Muell.	○	○	○	○	○	★	○	○	○	○	○	○	○	○		
P. pyriforme Brid.	○	○	●	○	○	○	★	○	○	○	○	○	○	○	VTA	NZ
[*P. conicum* Mitt., *P. subserratum* Hampe]																
[Previous record not substantiated: *P. flaccidum* Mitt.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
21. SPLACHNACEAE																
SPLACHNOBRYUM C. Muell.																
S. wattsii Broth.	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
TAYLORIA Hook.																
T. maidenii Broth.	○	○	○	○	○	○	●	★	○	○	○	○	○	○		
T. octoblepharum (Hook.) Mitt.	○	●	●	●	★	●	●	○	○	○	○	○	○	○	QVTS-WA	NZ, As, ?NG
T. purpurascens (Hook. & Wils.) Broth.	○	○	○	○	○	?	○	○	○	○	○	○	○	○		NZ
24. BRYACEAE																
BRACHYMENIUM Schwaegr.																
B. coarctatum Bosch. & Lac.	○	★	●	○	○	○	★	○	○	○	○	○	○	○	TA	NZ
B. exile (Dozy & Molk.) Bosch. & Lac.	○	○	○	★	○	○	★	○	○	○	○	○	○	○	A	As, Oc. Malesia
B. preissianum (Hampe) Jaeg.	○	○	●	○	○	○	★	○	○	○	○	○	○	○	QVTS-WA	NZ
[*B. chloroblastum* Watts & Whitel. *nom. nud.*, *B. pilosithecium* Watts & Whitel. *nom. nud.*]																

BRYUM Hedg.																
B. aeruginosum C. Muell.	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
B. albo-limbatum (Hampe) Jaeg.	○	○	★	○	○	○	○	○	○	○	○	○	○	○	QSW	
B. cf. altisetum C. Muell.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VA	
B. argenteum Hedw.	●	●	★	★	★	★	●	●	★	●	○	○	★	★	QVTYS-WA	Cosmop
B. argenteum Hedw. var. **lanatum** (P. Beauv.) Hampe	●	○	○	○	○	○	○	○	○	○	○	○	○	○		Cosmop
B. argenteum Hedw. var. **niveum** Wils.	●	○	○	○	○	○	○	○	○	○	○	○	○	○	T	
B. australe Hampe.	○	○	★	○	○	○	★	○	○	○	○	○	○	○	VTA	NZ
[*B. appressifolium* Broth.]																
B. bateae C. Muell.	○	○	○	★	○	○	○	○	○	○	○	○	○	○		
B. billardieri Schwaegr. var. **billardieri**	●	●	●	★	●	●	●	★	●	★	○	○	○	○	QVTSW	NZ, Eur, S Amer
[*B. abruptinervium* C. Muell., *B. brachyaris* C. Muell. in Mitt. *nom. nud.*, *B. breviramulosum* (Hampe) Mitt., *B. brunneidens*, C. Muell., *B. crenatidens* C. Muell. *nom. nud.*, *B. crispatum* (Hampe) Mitt., *nom. illeg.*, *B. forsythii* Broth., *B. globulare* Hampe in C. Muell. *nom. nud.*, *B. leptothecium* Tayl., *B. olivaceum* (Hampe) Mitt., *B. pohliaeopsis* C. Muell., *B. robustum* Hampe, *B. rufescens* Hook. f. & Wils. *nom. illeg.*, *B. subcrispatum* C. Muell., *B. subtomentosum* (Hampe) Mitt.]																
B. blandum Hook. f. & Wils.	○	○	○	○	○	★	●	○	○	○	○	○	○	○	VTA	NZ, Campbell I
[*B. oblongifolium* C. Muell.]																
B. caespiticium Hedw.	○	○	★	○	○	●	★	★	○	○	○	○	○	○	VTSA	Cosmop
[*B. laxirete* Broth.]																
B. calodictyon Broth.	○	○	○	○	○	○	○	○	●	○	○	○	○	○		
B. campylothecium Tayl.	●	○	○	○	○	★	●	○	●	●	○	★	○	○	VTSWA	NZ, S Amer
[*B. peraristatum* C. Muell., *B. howeanum* Broth. & Watts, *Brachymenium peraristatum* (C. Muell.) Kindb.]																
B. capillare Hedw.	●	●	●	★	○	★	●	●	★	★	○	○	★	○	QVTYS-WA	Cosmop
[*B. immarginatum* Broth., *B. leptothecioides* Broth. & Watts *nom. nud.*, *B. pusillum* Broth. *nom. illeg.*, *B. sublonginervium* Geh. in Watts & Whitel. *nom. nud.*, *B. whiteleggei* Broth. *nom. nud.*]																
B. capillare Hedw. ssp. **torquescens** (De Not.) Kindb.	○	●	●	○	★	●	★	●	★	★	○	○	○	○	VS	Cosmop
[?*B. synoicum*, C. Muell., *B. pyrothecium* C. Muell. & Hampe, *B. erythropyxis* C. Muell.]																
B. cellulare Hook.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
B. chrysoneuron C. Muell.	●	●	●	○	○	○	●	○	○	○	○	○	○	○	QTSWA	NZ, Oc, Eur, As, Afr
[*B. leptopelma* C. Muell., *B. lochoneuron* C. Muell., *B. microthecium* C. Muell., *B. suberythrocarpum* C. Muell., *B. wattsii* Broth.]																

24. BRYACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
BRYUM (cont'd)																
B. coronatum Schwaegr. [*B. subatropurpureum* C. Muell.]	●	●	●	★	○	●	★	○	●	○	○	○	○	○	QWA	Cosmop
B. crassum Hook. f. & Wils. [*B. austro-alpinum* C. Muell.]	○	○	★	○	○	○	○	○	○	○	○	○	○	○	VT	NZ
B. creberrimum Tayl. [*B. affine* Lindb. & Arn. *nom. illeg.*, *B. tasmanicum* Hampe]	○	★	★	★	○	★	●	○	★	○	○	○	○	○	VSW	NZ,N Amer, Eur, As,
B. cupulatum C. Muell.	○	○	●	○	○	○	○	○	○	○	○	○	○	○	VTS	
B. dichotomum Hedw. [*B. acquicollum* Broth. & Watts, *B. brachytheciella* C. Muell., *B. philonotideum* Broth. & Watts, *B. pimpamae* C. Muell., *B. subcupulatum* C. Muell. ex Rodw.]	●	○	●	○	○	●	★	○	○	★	○	○	★	○	QVTSA	NZ, Amer, Subant I
B. diversinerve Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
B. erythrocarpoides C. Muell. & Hampe [*B. clavatum* Hook. f. & Wils., *B. curvicollum* Mitt..*B. filarium* Broth., *B. kiamae* Broth., *B. subcurvicollum* Broth.]	●	●	●	○	★	★	●	○	★	○	○	○	○	○	QVTSA	NZ, S Afr, Oc
B. laevigatum Hook. f. & Wils.	○	★	○	○	○	○	●	○	○	★	○	○	○	○	VTA	NZ, S Afr, S Amer, Subant I
B. leucocanthum (Hampe) Mitt. [*Rhodobryum leucocanthum* Hampe]	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
B. limbifolium Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
B. muehlenbeckii B.S.G. [*B. cheelii* Broth.]	○	○	●	○	○	○	★	○	○	○	○	○	○	○	A	Cosmop
B. nitens Hook. [*B. baileyi* Broth., *B. pachypomatulum* Broth., *B. subpachypoma* Hampe, *B. micropachypoma* Broth. *nom. nud.*]	○	●	★	○	○	★	○	○	○	○	○	○	○	○	Q	As, Afr, Oc
B. pachytheca C. Muell. [*B. bicolor* Dicks., *B. gambierense* C. Muell., *B. microerythrocarpum* C. Muell. & Kindb., *B. subaeneum* Hampe & C. Muell., *B. sullivanii* C. Muell.]	○	●	●	★	○	★	●	○	●	★	●	○	★	○	QVTYS-WA	Cosmop
B. cf. pallens Sw.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	A	
B. perlimbatum Card.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		S Amer

B. plumosum Dozy & Molk. [*B. pachypoma* Mont.]	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
B. pseudotriquetrum (Hedw.) Gaertn. [*B. austro-affine* Broth., *B. binum* (Brid.) Turn., *B. subventricosum* Broth.]	○	○	●	○	○	○	●	○	○	○	○	○	○	○	VTSWA	Cosmop
B. roseodens C. Muell.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		S Amer
B. sauteri B.S.G.	●	○	★	○	○	○	○	○	○	○	○	○	○	○	V	NZ, Eur
B. subapiculatum Hampe	○	○	○	○	○	○	★	○	○	○	○	○	○	○	A	
B. subfasciculatum (Hampe) Mitt. [*B. amoenum* Wright non Broth. *nom. nud.*, *B. dilatato-marginatum* C. Muell., *Rhodobrynm subfasciculatum*, Hampe, *Bryum subolivaceum* C. Muell., *?B. viridulum* C. Muell. *nom. illeg.*]	★	●	●	○	★	○	○	○	○	○	○	○	○	○		Oe
[Previous record not substantiated: *B. baeuerlenii* C. Muell., *B. brachycladulum* C. Muell., *B. ischyrrodon* C. Muell.] Wils.	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
LEPTOBRYUM (B.S.G.) Wils.																
L. pyriforme (Hedw.)	○	○	●	○	○	○	●	○	○	○	○	○	○	○	VTSA	Cosmop
MIELICHHOFERIA Nees & Hornsch																
M. australis Hampe [*M. forsythii* Broth.]	○	○	○	○	○	○	●	○	★	★	○	○	○	○	VA	Afr, NZ
M. bryoides (Harv.) Wijk & Marg. [*M. ecklonii* Hornsch.]	○	○	○	★	○	★	★	○	○	○	○	○	○	○	VTSA	NZ, S Afr, Madagascar
M. turgens Broth.	○	○	○	○	○	○	○	○	●	★	○	○	○	○		
ORTHODONTIUM Schwaegr.																
O. inflatum (Mitt.) Par. [*O. ovale* C. Muell. ex Broth., *Wilsoniella compacta* Geh.in Watts & Whitel. *nom. nud.*]	○	★	●	○	○	★	○	○	○	○	○	○	○	○	V	
O. lineare Schwaegr. ssp. **sulcatum** (Hook. f. & Wils.) Meijer [*O. australe* Hook. f. & Wils., *O. sulcatum* Hook. f. & Wils., *O. pallens* (Hook. f. & Wils.) Broth., *O. zetterstedtii* C. Muell., *Aplodium lineare* Mitt. *nom. illeg.*]	○	○	●	○	★	★	●	○	○	○	○	○	○	○	VTSWA	NZ, Afr, S Amer, Subant l

24. BRYACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
POHLIA Hedw.																
P. austro-carnea Broth.	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
P. bulbifera (Warnst.) Warnst.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		N Hemis
P. cruda (Hedw.) Lindb. [*P. erythrocaulis* Watts & Whitel.]	○	○	○	○	○	★	★	○	○	○	○	○	○	○	VTS	NZ. Cosmop
P. mielichhoferia (C. Muell.) Broth.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	V	
P. nutans (Hedw.) Lindb. [*Webera nutans* Hedw.]	○	○	★	○	★	●	●	○	○	○	○	○	○	○	VTS?W-?A	Cosmop
P. tenuifolia (Jaeg.) Broth. [*Webera tenuifolia* Jaeg.]	○	○	★	○	○	○	○	○	○	○	○	○	○	○		NZ
P. wahlenbergii (Web. & Mohr) Andrews [*Mniobryum wahlenbergii* (Web. & Mohr) Jenn., *M. tasmanicum* Broth.. *M. albicans* (Wahlenb.) Limpr.]	○	○	○	○	●	○	●	○	○	★	○	○	○	○	VTA	Cosmop
RHODOBRYUM (Schimp.) Hampe																
R. aubertii (Schwaegr.) Thér.	○	●	○	○	○	○	○	○	○	○	○	○	○	○		S Afr. S Amer. Madagas-car, Oc
R. graeffeanum (C. Muell.) Par.	○	★	★	○	○	★	○	○	○	○	○	○	○	○	Q	
25. LEPTOSTOMATACEAE																
LEPTOSTOMUM R. Br.																
L. erectum R. Br.	○	●	●	★	★	●	★	○	★	○	○	○	○	○	QV	Malesia
L. inclinans R. Br.	○	●	○	○	●	●	●	○	○	○	★	○	○	○	QVTA	NZ, Subant I
L. macrocarpum (Hedw.) Pyl.	★	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	NZ, Oc, Norfolk I
26. MNIACEAE																
PLAGIOMNIUM T. Kop.																
P. novae-zealandiae (Col.) T. Kop. [*Mnium longirostrum* Brid., *M. novae-valesiae* C. Muell. in Geh., *M. rostratum* auct. non Schrad.]	○	○	○	●	●	○	●	○	○	○	○	○	○	○	VT	NZ

30. MITTENIACEAE

MITTENIA Lindb.																	
M. plumula (Mitt.) Lindb. [*M. rotundifolia* (C. Muell.) Par.]	○	●	●	●	○	●	●	○	○	○	○	○	○	○	QVTWA	NZ

31. CALOMNIACEAE

CALOMNION Hook. f. & Wils.																
C. complanatum (Hook. f. & Wils.) Lindb. [*C. laetum* Hook. f. & Wils. *nom. illeg.*]	○	○	●	○	○	○	○	○	○	○	○	○	○	○		NZ

32. RHIZOGONIACEAE

GONIOBRYUM Lindb.																
G. subbasilare (Hook.) Lindb. [*G. pellucidum* (Mitt.) Broth.]	○	○	○	●	○	○	●	○	○	○	○	○	○	○	VT	NZ, Oc, S Amer
HYMENODON Hook. f. & Wils.																
H. pilifer Hook. f. & Wils.	○	○	★	○	○	○	★	○	○	○	○	○	○	○	QVT	NZ, Oc
LEPTOTHECA Schwacgr.†																
L. gaudichaudii Schwaegr. var. **gaudichaudii**	○	○	○	●	●	●	●	○	★	○	○	○	○	○	QVTA	NZ, S Afr, S Amer
MESOCHAETE Lind.																
M. undulata Lindb.	●	●	●	●	●	●	○	○	○	○	○	○	○	○	QV	NZ, SE As
PYRRHOBRYUM Mitt.																
P. mnioides (Hook.) Manuel [*Rhizogonium mnioides* (Hook.) Wils. in Hook.]	○	●	★	●	★	●	○	○	○	○	○	○	○	○	QVTA	NZ, S Amer
P. parramattense (C. Muell.) Manuel [*Rhizogonium parramattense* (C. Muell.) Reichdt.]	●	●	●	●	●	●	●	○	○	○	○	○	○	○	QVT	Norfolk I
P. spiniforme (Hcdw.) Manuel [*Rhizogonium spiniforme* Hedw.]	○	●	●	●	○	●	○	○	○	○	○	○	○	○	Q	As, Malesia

† See Churchill & Buck (1982).

32. RHIZOGONIACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
RHIZOGONIUM Brid.																
R. bifarium (Hook.) Schimp.	○	○	●	○	★	○	★	○	○	○	○	○	○	○	VTA	NZ
R. distichum (Sw.) Brid.	○	●	●	★	○	●	●	○	○	○	○	○	○	○	QVTA	As, NZ, Oc
[*R. graeffeanum* (C. Muell.) Jaeg., *R. geheebii* C. Muell.]																
R. novae-hollandiae (Brid.) Brid.	○	●	●	○	○	●	★	○	○	○	○	○	○	○	VTA	NZ, As, S Amer
R. pennatum Hook. f. & Wils. var. **aristatum** (Hampe) Dix.	○	○	○	○	○	●	○	○	○	○	○	○	○	○	T	NZ
33. HYPNODENDRACEAE																
BRAITHWAITEA Lindb.																
B. sulcata (Hook.) Jaeg.	★	●	●	●	●	○	○	○	○	○	○	○	○	○	QV	NZ, Oc, N Caled
HYPNODENDRON (C. Muell.) Lindb. ex Mitt.																
H. colensoi (Hook. f. & Wils.) Mitt. [Known only from a specimen in NY (Touw 1971)]	○	○	○	○	○	★	○	○	○	○	○	○	○	○	?T	NZ
H. comosum (Labill.) Mitt. [*Mniodendron comosum* (Labill.) Lindb.]	○	○	●	★	●	○	○	○	○	○	○	○	○	○	VT	NZ
H. spininervium (Hook.) Jaeg. ssp. **archeri** (Mitt.) Touw [*H. arcuatum* Hedw. *emend.* Mitt. *pro parte*]	○	●	●	●	○	●	○	○	○	○	○	○	○	○	VT	
H. vitiense Mitt. ssp. **australe** Touw [*H. whiteleggei* C. Muell. ex Burges *nom. nud.*, *H. arcuatum* non Hedw.]	○	●	●	●	●	●	●	○	○	●	○	○	○	○	QVTA	As, Oc
34. AULACOMNIACEAE																
AULACOMNIUM Schwaegr.																
A. palustre (Hedw.) Schwaegr.	○	●	○	○	○	○	●	○	○	○	○	○	○	○	VTA	Cosmop

35. MEESIACEAE

MEESIA Hedw.																
M. muelleri C. Muell. & Hampe	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VA	NZ
M. triquetra (Hook. & Tayl.) Aongstr.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VA	N Hemis

37. BARTRAMIACEAE

BARTRAMIA Hedw.																
B. halleriana Hedw.	○	○	○	○	○	○	●	★	○	○	○	○	○	○	VT	NZ, Cosmop
[*B. mossmanniana* C. Muell.]																
B. hampei (Mitt.) Catcheside	○	○	○	○	★	○	●	○	●	○	○	○	○	○	VTSWA	
[*Bartramidula hampei* Mitt., *Bartramia erecta* (Hampe) Broth. *nom. illeg.*]																
B. papillata Hook. f. & Wils.	○	○	●	○	●	●	●	●	★	★	○	○	○	○	QVTS-WA	NZ, Subant I
B. strieta Brid.	○	○	●	○	★	○	★	★	○	●	○	○	○	○	QTWA	
[*B. strictifolia* Tayl.] (not the same as N Hemis sp. — under review by Catcheside)																
B. timmioides C. Muell.	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
[Known only from type in BM]																
BREUTELIA (B.S.G.) Schimp.																
B. affinis (Hook.) Mitt.	○	○	●	★	●	●	●	●	●	●	○	○	★	○	QVTS-WA	NZ
[*B. commutata* Jaeg. *nom. illeg.*, *Philonotis affinis* (Hook.) Jaeg.]																
B. pendula (Sm.) Mitt.	○	★	●	●	●	●	●	★	○	○	○	○	○	○	QVTWA	NZ, S Afr, S Amer, Subant I
[*B. divaricata* (Mitt.) Mitt., *B. fusco-aurea* Broth., *B. sieberi* (Hornseh. ex C. Muell.) Mitt.]																
B. pseudo-philonotis (C. Muell.) Watts & Whitel.	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
[Previous record not substantiated:	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
B. baeuerlenii (C. Muell.) Watts & Whitel., *B. leptodontoides* (C. Muell.) Watts & Whitel., *B. lonchopelma* (C. Muell.) Watts & Whitel.]																
CONOSTOMUM Swartz																
C. eurvirostre (Mitt.) Mitt.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VA	NZ
C. pentastichum (Brid.) Lindb.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTA	NZ, S Afr, S Amer
[*C. australe* Sw.]																
C. pusillum Hook. f. & Wils.	○	○	○	○	○	●	●	○	○	○	○	○	○	○	VTA	NZ

37. BARTRAMIACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
PHILONOTIS Brid.																
P. austro-falcata Broth. & Watts	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
P. dicranellacea (C. Muell.) Watts & Whitel.	○	●	●	○	○	○	●	○	○	○	○	○	○	○	Q	
P. jardinii (Besch.) Par.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		Oc
P. pseudomollis (C. Muell.) Jaeg.	○	●	●	○	○	○	○	○	●	○	○	○	○	○		
P. scabrifolia (Hook. f. & Wils.) Braithw. [*P. appressa* (Hook. f. & Wils.) Mitt., *P. remotifolia* (Hook. f. & Wils.) Jaeg.]	○	○	○	○	●	●	●	○	●	○	○	○	○	○	VTSWA	NZ, Oc, S Afr, C&S Amer, Subant I
P. slateri (Hampe) Jaeg.	○	●	★	○	○	○	○	○	○	○	○	○	○	○	Q	
P. tenuis (Tayl.) Reichdt. [*P. fertilis* (Mitt.) Mitt., *P. pseudomollis* (C. Muell.) Jaeg.]	●	●	●	○	○	●	●	○	○	○	○	●	★	○	QVTYS-WA	NZ, Afr
P. tortifolia (C. Muell.) Watts & Whitel.	○	●	★	○	●	●	○	○	○	○	○	○	○	○	Q	
38. SPIRIDENTACEAE																
SPIRIDENS Nees																
S. vieillardii Schimp. [*S. muelleri* Hampe]	●	○	○	○	○	○	○	○	○	○	○	○	○	○		Malesia, Oc
40. ERPODIACEAE																
AULACOPILUM Wils.																
A. glaucum Wils.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	NZ
A. hodgkinsoniae (Hampe & C. Muell.) Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
41. PTYCHOMITRIACEAE†																
PTYCHOMITRIUM Fuernr.																
P. australe (Hampe) Jaeg. [*P. adamsonii* (Mitt.) Jaeg., *Glyphomitrium adamsonii* Mitt., *Brachysteleum australe* (Hampe) Jaeg.]	●	●	○	●	●	●	●	●	●	○	○	★	○	○	QVTS-WA	NZ

† Transferred to Grimmiaceae by Churchill (1982).

P. laxifolium (C. Muell.) Par. [*Brachysteleum laxifolium* C. Muell.]	○	★	●	●	★	○	○	★	○	○	○	○	○	○			
P. mittenii Jaeg. [*P. serratum* (Mitt.) Hook. f. & Wils. *nom. illeg.*]	○	○	○	●	○	○	●	○	○	○	○	○	○	○	VT		
P. muelleri (Mitt.) Jaeg. [*P. commutatum* (C. Muell.) Par., *Glyphomitrium muelleri* (C. Muell.) Broth., *G. howeanum* (Hampe) Broth.]	●	●	●	●	●	●	○	●	○	○	○	○	○	○	QV		
42. ORTHOTRICHACEAE																	
AMPHIDIUM Schimp.																	
A. cyathicarpum (Mont.) Broth.	○	○	○	○	★	○	●	○	○	★	○	○	○	○	VTSW	NZ, Afr, S Amer, Oc	
MACROCOMA (C. Muell.) Grout																	
M. tenue (Hook. & Grev.) Vitt ssp. **tenue** [*Macromitrium eucalyptorum* C. Muell. & Hampe, *M. microphyllum* (Hook. & Grev.) Brid., *M. geheebii* C. Muell., *M. novae-valesiae* C. Muell.]	○	●	●	●	●	●	●	○	○	○	○	○	○	○	QVTS	NZ, SE As	
MACROMITRIUM Brid.†																	
M. archeri Mitt. in Hook. f. [*M. pusillum* Mitt.]	○	●	●	○	○	○	○	○	○	○	○	○	○	○	QVT		
M. aurescens Hampe	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	N Caled	
M. brachypodium C. Muell. [*M. brevisetaceum* Hampe]	●	○	○	○	○	○	○	○	○	○	○	○	○	○	Q	N Caled	
M. brevicaule (Besch.) Broth. [*M. subbrevicaule* Broth. & Watts, *M. wattsii* Broth.]	●	●	●	●	○	○	○	○	○	○	○	○	○	○	Q	NZ, Norfolk I, N Caled	
M. caloblastoides C. Muell. [*M. dimorphum* C. Muell.]	○	●	●	○	○	○	○	○	○	○	○	○	○	○	Q		
M. diaphanum C. Muell. [*M. circinicladum* C. Muell.]	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q		
M. exsertum Broth.	○	●	●	●	●	●	○	○	○	○	○	○	○	○	Q		
M. hemitrichodes Schwaegr.	○	●	●	●	○	●	●	○	○	○	○	○	○	○	QV		
M. hortonae Vitt & Ramsay (ms)‡	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q		

† Revision by Vitt & Ramsay (manuscript) — only synonyms applicable to NSW collections are included except when clarification with an Australian used name is needed.
‡ Manuscript names, nov. sp. or ssp.

42. ORTHOTRICHACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
MACROMITRIUM (cont'd)																
M. involutifolium (Hook. & Grev.) Schwaegr. *sensu lato* [*M. daemelii* C. Muell.] [*M. malacoblastum* C. Muell.]	○	●	●	●	●	●	○	○	○	○	○	○	○	○	QT	
M. involutifolium (Hook. & Grev.) Schwaegr. ssp. **involutifolium**‡	○	●	●	○	●	●	○	○	○	○	○	○	○	○	Q	N Caled
M. involutifolium (Hook. & Grev.) Schwaegr. ssp. **ptychomitrioides** (Besch.) Vitt & Ramsay (ms) [*M. carinatum* Mitt.]	○	●	●	●	●	●	●	○	○	○	○	○	○	○	Q	N Caled
M. leratii Broth.	★	●	★	★	○	○	○	○	○	○	○	○	○	○	Q	N Caled
M. ligulaefolium Broth. [*M. ligulatulum* C. Muell., *M. woollsianum* C. Muell.]	○	●	●	○	●	●	●	○	○	○	○	○	○	○	QVTA	NZ, N Caled
M. ligulare Mitt. [*M. asperulum* Mitt., *M. weissioides* C. Muell.]	○	●	●	●	●	●	○	○	○	○	○	○	○	○	QVA	NZ
M. longirostre (Hook.) Schwaegr. [*M. rodwayi* Dix. in Weym. & Rodw.]	○	○	★	○	○	○	○	○	○	○	○	○	○	○	VT	NZ, Subant I, S Amer
M. microstomum (Hook. & Grev.) Schwaegr. [*M. prolixum* Bosw., *M. scottiae* C. Muell., *M. tasmanicum* Broth., *M. weymouthii* Broth.]	○	●	●	●	●	●	○	○	○	○	○	○	○	○	QVT	NZ, Japan, Hawaii, Java, Pac I
M. peraristatum Broth.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
M. repandum C. Muell. [*M. pugionifolium* C. Muell., *M. whiteleggei* Broth. & Geh.]	○	●	●	●	○	○	○	○	○	○	○	○	○	○	Q	
M. stoneae Vitt & Ramsay (ms)‡	○	●	○	○	●	○	○	○	○	○	○	○	○	○	Q	

‡ Manuscript names. nov. sp. or ssp.

ORTHOTRICHUM Hedw.†																
O. cupulatum Hoffm. ex Brid. var. **cupulatum**	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VA	Eur. As. Afr. N Amer
O. hortense Bosw.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	V	NZ
O. longithecum R. Br. ter.	○	○	○	○	○	○	●	○	●	●	○	○	○	○	VA	NZ
[*O. acroblepharis* C. Muell.]																
O. rupestre Schleich. ex Schwaegr. var. **rupestre**	○	○	○	○	○	○	●	○	○	★	○	○	○	○	VTA	Cosmop
[*O. sullivanii* C. Muell.]																
O. tasmanicum Hook. f. & Wils. var. **tasmanicum**	○	○	●	●	○	★	●	○	○	○	○	○	○	○	QVTSA	NZ
[*O. encalyptaceum* C. Muell., *O. laterale* Hampe, *O. campbelliae* Watts & Whitel.]																
SCHLOTHEIMIA Brid.																
S. brownii Schwaegr.	○	●	●	●	○	●	○	○	○	○	○	○	○	○	QV	NZ
[*S. baileyi* Broth.]																
S. funiformis Tayl. ex Dix.	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
ZYGODON Hook. & Tayl.																
Z. hookeri Hampe	○	○	○	○	★	○	●	○	○	○	○	○	○	○	VTS	NZ
Z. intermedius B.S.G.	○	○	★	○	○	●	●	○	○	★	○	○	○	○	QVTWA	S Hemis. As
[*Z. brownii* Schwaegr.]																
Z. menziesii (Schwaegr.) Arnott	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTSWA	NZ, S Amer

44. RACOPILACEAE

RACOPILUM P. Beauv.‡																
R. cuspidigerum (Schwaegr.) Aongst. var. **cuspidigerum**	●	○	○	○	○	○	○	○	○	○	○	○	○	○		Oc
[*R. pacificum* Besch.]																
R. cuspidigerum (Schwaegr.) Aongst. var. **convolutaceum** (C. Muell.) Zant. & Dijkstra	●	●	●	●	●	●	●	○	●	○	○	○	○	○	QVTS-WA	NZ
[*R. convolutaeceum* (C. Muell.) Reichdt., *R. strumiferum* auct. non (C. Muell.) Mitt. as in NSW]																

† Determined by J. Lewinsky (in press).

‡ Based on studies by van Zanten & Dijkstra (unpubl.).

47. HEDWIGIACEAE	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
HEDWIGIA P. Beauv.																
H. ciliata (Hedw.) Ehrh. ex P. Beauv. .. .. [*H. albicans* Lindb. *nom. illeg.*, *H. juratzkae* C. Muell., *H. microcyathea* (C. Muell.) Par.]	○	●	●	●	●	●	●	●	●	●	●	●	○	○	QVTS-WA	Cosmop
H. integrifolia P. Beauv. .. .. [*Hedwigidium integrifolium* (P. Beauv.) Dix., *Hedwigidium imberbe* (Sm.) B.S.G.]	○	●	●	●	●	●	●	★	●	●	○	○	○	○	QVTS-WA	Cosmop
RHACOCARPUS Lindb.																
R. purpuraseens (Brid.) Par. .. .. [*R. australis* (Hook. f. & Wils.) Par., *R. humboldtii* (Hook.) Lindb.]	○	★	●	●	○	●	★	○	○	○	○	○	○	○	QVTWA	NZ, Afr, N&S Amer, Subant I
48. CRYPHAEACEAE																
CRYPHAEA Mohr.																
C. dilatata Hook. f. & Wils. .. .. [*C. muelleri* (Hampe) Broth., *Cryphidium muelleri* (Hampe) Broth., *Cyptodon dilatatus* (Hook. f. & Wils.) Par. & Schimp.]	○	●	○	●	★	○	★	○	○	○	○	○	○	○	QVS	NZ
C. exannulata Dix. & Sainsb.	○	●	●	●	○	○	★	○	○	○	○	○	○	○	QV	NZ
C. ovalifolia (C. Muell.) Jaeg. .. .. [*Cyptodon ovalifolius* (C. Muell.) Fleisch., *Cryphidium ovalifolium* (C. Muell.) Broth., *Cryphaea squarrulosa* Hampe, *Cryphidium squarrulosum* (Hampe) Broth.]	○	●	★	○	○	○	○	○	○	○	○	○	○	○	Q	NZ, Oc
C. tasmanica Mitt. in Hook. f. & Wils. ..	○	○	○	○	○	★	★	○	○	○	○	○	○	○	VTA	
C. tenella Hornsch. ex C. Muell. .. .. .. [*C. brevidens* C. Muell.]	○	●	●	●	○	○	○	○	○	○	○	○	○	○	Q?V?T	NZ
FORSSTROEMIA Lind.																
F. australis (C. Muell.) Par.	○	●	●	○	○	○	○	○	○	○	○	○	○	○	Q	
F. subproducta (C. Muell.) Broth.	○	●	●	○	○	○	○	○	○	○	○	○	○	○	Q	
50. CYRTOPODACEAE																
BESCHERELLIA Duby																
B. brevifolia Hampe .. .. [*B. cyrtopus* C. Muell., *Cyrtopus bescherellioides* C. Muell.]	○	●	●	○	○	○	○	○	○	○	○	○	○	○	Q	As, N Amer

51. PTYCHOMNIACEAE

GLYPHOTHECIUM Hampe																
G. sciuroides (Hook.) Hampe	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VTA	NZ, SE As
[Previous record not substantiated: *G. perrotii* C. Muell.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
HAMPEELA C. Muell.																
H. pallens (Lac.) Fleisch.	○	●	●	●	○	●	○	○	○	○	○	○	○	○	QV	NZ, SE As
[*Whiteleggea australis* (Broth.) Broth. ex Par.]																
PTYCHOMNION Hook. f. & Wils.) Mitt																
P. aciculare (Brid.) Mitt.	●	●	●	●	●	●	●	○	○	○	○	○	○	○	QVTS	NZ, Afr, Oc, S Amer, Subant I

57. PTEROBRYACEAE

ENDOTRICHELLA C. Muell.																
E. dietrichiae C. Muell.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
E. lepida C. Muell.	○	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	
EUPTYCHIUM Schimp.																
E. mucronatum Hampe	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
E. robustum Hampe	●	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
E. setigerum (Sull.) Broth.	★	○	○	○	○	○	○	○	○	○	○	○	○	○		Oc
[*E. cuspidatum* (Mitt.) Mitt.]																
MUELLEROBRYUM Fleisch.																
M. whiteleggei (Broth.) Fleisch.	○	●	●	○	○	○	○	○	○	○	○	○	○	○	Q	
[*Pterobryon whiteleggei* Broth.]																
PTEROBRYELLA (C. Muell.) Jaeg.																
P. praenitens (Hampe) C. Muell.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
[*Hypnodendron praenitens* (Hampe) Mitt.]																
PTEROBRYIDIUM Broth. & Watts																
P. australe Broth. & Watts	○	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	
TRACHYLOMA Brid.																
T. diversinerve Hampe in F. Muell.	○	●	●	●	○	○	○	○	○	○	○	○	○	○	QVT	NZ, N Caled
[*T. leptopyxis* C. Muell.]																
T. planifolium (Hedw.) Brid.	○	●	●	★	●	★	○	○	○	○	○	○	○	○	QVT	NZ
T. wattsii Broth.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		

58. METEORIACEAE	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
BARBELLA Fleisch.																
B. enervis (Thwait. & Mitt.) Fleisch. [*Meteorium trichophoroides* (C. Muell.) Mitt.]	●	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	As, Oc
PAPILLARIA (C. Muell.) C. Muell.																
P. amblyacis (C. Muell.) Jaeg. [*Meteorium amblyacis* (C. Muell.) Mitt.]	○	●	●	★	●	●	●	○	★	○	○	○	○	○	Q	NZ, Oc
P. crocea (Hampe) Jaeg. [*Meteorium kermadecense* (C. Muell.) Mitt., *P. kermadecensis* (C. Muell.) Jaeg., *Trachypus hornschuchii* Mitt.]	○	●	●	●	○	●	●	★	○	○	○	○	○	○	QVT	NZ, Oc
P. flavolimbata (C. Muell. & Hampe) Jaeg. [*P. cerina* (Hook. f. & Wils.) Par.]	○	●	●	●	●	●	●	○	○	○	○	○	○	○	QVT	NZ
P. flexicaulis (Wils.) Jaeg. [*P. filipendula* (Hook. f. & Wils.) Jaeg., *P. scottiae* (C. Muell.) Par., *Cryphaea novae-valesiae* C. Muell. *nom. nud.*]	○	●	●	★	★	●	●	○	★	○	○	○	○	○	QT	As, NZ, S Amer
P. intricata (Mitt.) C. Muell. & Broth. [*Meteorium intricatum* Mitt.]	○	●	○	○	○	○	○	○	○	○	○	○	○	○		Oc
P. nitens (Hook. f. & Wils.) Sainsb. [*P. nitidiuscula* Broth.]	○	●	●	○	○	★	○	○	○	○	○	○	○	○	QVT	NZ
PILOTRICHELLA (C. Muell.) Besch.																
P. dimorpha (C. Muell.) Jaeg. [*Meteorium dimorphum* (C. Muell.) Mitt.]	○	★	○	○	○	★	○	○	○	○	○	○	○	○		
WEYMOUTHIA Broth.																
W. mollis (Hedw.) Broth.	●	○	○	○	○	★	○	○	○	○	○	○	○	○	VT	NZ, S Amer
59. PHYLLOGONIACEAE†																
CATAGONIUM C. Muell. ex Broth.																
C. politum (Hook. f. & Wils.) Dus. ex Broth.	●	★	○	○	★	★	●	○	○	○	○	○	○	○	QVTA	Afr, NZ, S Amer
ORTHORRHYNCHIUM Reichdt.																
O. elegans (Hook. f. & Wils.) Reichdt. [*O. cymbifolioides* C. Muell., *O. hampeanum* C. Muell.]	●	●	●	○	○	○	○	○	○	○	○	○	○	○	Q	SE As, NZ, Oc

†See Lin (1983) for new classification.

60. NECKERACEAE

CALYPTOTHECIUM Mitt.																	
C. acutum (Mitt.) Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q		
C. cuspidatum (Okam.) Nog.	○	?	○	○	○	○	○	○	○	○	○	○	○	○			As
C. humile (Mitt.) Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○			S Amer
LEPTODON Moh.																	
L. smithii (Hedw.) Web. & Mohr.	○	●	●	●	○	●	●	★	●	●	○	○	○	○	QVA		Cosmop
[*L. australis* C. Muell.]																	
NECKERA Hedw.																	
N. pennata Hedw.	○	●	●	●	●	●	●	○	○	○	○	○	○	○	QVT		Cosmop
[*N. hymenodonta* C. Muell.]																	
N. leichhardtii Hampe	○	★	○	○	○	○	○	○	○	○	○	○	○	○			
[Known only from specimen in BM.]																	
THAMNOBRYUM Nieuwl.																	
T. pandum (Hook. f. & Wils.) Stone & Scott	○	●	●	●	○	●	○	○	○	○	○	○	○	○	Q		NZ, SE As
[*Thamnium pandum* (Hook f. & Wils.) Jacg., *Thamnium eflagellare* Aongstr.]																	
T. pumilum (Hook. f. & Wils.) Nieuwl.	★	●	●	●	○	○	●	○	○	○	○	○	○	○	QVTA		NZ, Oe, S Amer
[*Thamnium pumilum* (Hook. f. & Wils.) Kindb., *Thamnium gracillimum* (Hampe) Broth. & Watts, *Homalia acuminata* C. Muell.]																	
[Previous record not substantiated: *T. novae-valesiae* Kindb.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○			

61. LEMBOPHYLLACEAE

CAMPTOCHAETE Reichdt.																	
C. arbuscula (Sm.) Reichdt.	●	●	●	●	○	●	●	○	○	○	○	○	○	○	QVTA		NZ, As, Oe
[*C. ramulosa* (Mitt.) Jaeg., *Porotrichum arbusculum* (Sm.) Mitt.]																	
C. arbuscula (Sm.) Reichdt. var. **deflexa** (Wils.) Dix.	●	★	○	○	○	○	○	○	○	○	○	○	○	○			NZ, Oe
[*C. brisbanica* C. Muell. *nom.nud. in synon.*, *C. deflexa* (Wils. Jaeg.]																	
C. excavata (Tayl.) Jaeg.	○	●	●	●	○	○	○	○	○	○	○	○	○	○			
C. gracilis (Hook. f. & Wils.) Par.	○	●	●	●	○	○	●	○	○	○	○	○	○	○	QVT		NZ, S Amer
[*Lembophyllum brisbanicum* C. Muell. *nom. nud.*]																	
C. leichhardtii (Jacg.) Broth.	○	●	●	○	★	?	○	○	○	○	○	○	○	○	Q		Oe

61. LEMBOPHYLLACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
CAMPTOCHAETE (cont'd)																
C. schlosseri (Sendtn.) Broth. ex Par.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
C. vaga (C. Muell.) Broth.	●	●	●	●	●	●	★	○	★	○	○	○	○	○	Q	NZ
[*Lembophyllum vagum* (C. Muell.) Lindb., *Porotrichum vagum* (C. Muell.) Mitt.]																
LEMBOPHYLLUM Lind.																
L. divulsum (Hook. f. & Wils.) Lindb.	○	●	○	●	●	●	●	○	○	○	○	○	○	○	QVTSA	NZ, Subant I
[*L. clandestinum* (Hook. f. & Wils.) Lindb., *Porotrichum clandestinum* (Hook. f. & Wils.) Mitt.]																
62. ECHINODIACEAE																
ECHINODIUM Jur.																
E. hispidum (Hook. f. & Wils.) Reichdt. ..	●	●	○	●	●	○	○	○	○	○	○	○	○	○	QVT	Oc, NZ
[*Sciaromium hispidum* (Hook. f. & Wils.) Par., *E. arboreum* Broth.]																
E. parvulum Broth. & Watts	★	○	○	○	○	○	○	○	○	○	○	○	○	○		
65. HOOKERIACEAE																
ACHROPHYLLUM Vitt & Crosby																
A. dentatum (Hook. f. & Wils.) Vitt & Crosby	●	●	●	●	●	●	●	○	○	○	○	○	○	○	QVTSA	NZ, Afr, S Amer, Subant I
[*Pterygophyllum dentatum* (Hook. f. & Wils.) Dix., *P. hepaticaefolium* (Hampe & C. Muell.) Jaeg., *P. nigellum* (Hook. f. & Wils.) Mitt.]																
A. wattsii (Broth.) Vitt & Crosby	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
[*Pterygophyllum wattsii* Broth.]																

CALYPTROCHAETA Desv.																	
C. apiculata (Hook. f. & Wils.) Vitt .. .. [*Eriopus apiculatus* (Hook. f. & Wils.) Mitt.]	○	○	★	○	○	○	○	○	○	○	○	○	○	○	VTS	NZ, S Amer, Subant I
CYCLODICTYON Mitt.																	
C. lepidum (Mitt.) Broth. & Watts .. .. .. [*Hookeria karsteniana* Broth. & Geh.]	○	●	○	○	○	○	○	○	○	○	○	○	○	○		As
DISTICHOPHYLLUM Dozy & Molk.																	
D. baileyanum C. Muell.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
D. complanatum (Hampe) Mitt.	○	○	○	○	○	●	★	○	○	○	○	○	○	○	V	
D. crispulum (Hook. f. & Wils.) Mitt. .. .. [*Mniadelphus crispulus* (Hook. f. & Wils.) C. Muell., *M. adnatus* (Hook. f. & Wils.) Reichdt.]	○	★	●	○	○	●	○	○	○	○	○	○	○	○	VT	NZ
D. longicuspis Broth. .. .. [*D. leucoloma* Broth. *nom. nud.*]	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
D. microcarpum (Hedw.) Mitt.	○	○	○	★	○	★	●	○	○	○	○	○	○	○	VTSA	NZ
D. minutifolium C. Muell.	○	○	●	○	○	●	○	○	○	○	○	○	○	○		
D. pulchellum (Hampe) Mitt. .. .. [*D. amblyophyllum* (Hook. f. & Wils.) Mitt., *Mniadelphus amblyophyllus* (Hook. f. & Wils.) Jaeg.]	○	●	●	●	○	●	●	○	○	○	○	○	○	○	QVTSA	NZ
D. rotundifolium (Hook. f. & Wils.) C. Muell. & Broth. .. .. [*D. squarrosulum* C. Muell., *D. fissidentoides* C. Muell.]	○	○	●	●	○	○	●	○	○	○	○	○	○	○	T	NZ, S Amer
D. subminutifolium (Broth. & Geh.) Fleisch. [*Mniadelphus subminutifolius* Broth. & Geh.]	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
D. whiteleggeanum C. Muell.	○	○	○	○	○	★	○	○	○	○	○	○	○	○		
SAULOMA (Hook. f. & Wils.) Mitt.																	
S. tenella (Hook. f. & Wils.) Mitt.	○	○	○	○	●	○	●	○	○	○	○	○	○	○	VTA	NZ, S Amer

68. HYPOPTERYGIACEAE	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
CYATHOPHORUM P. Beauv.																
C. bulbosum (Hedw.) C. Muell.	●	●	○	●	●	●	●	○	○	○	○	○	○	○	QVT	NZ, As, Oc
[*C. pennatum* (Labill.) Brid., *C. pteridioides* P. Beauv.]																
HYPOPTERYGIUM Brid.																
H. muelleri Hampe	●	●	●	●	●	●	●	○	○	○	○	○	○	○	Q	NZ, As
[*H. scottiae* C. Muell.]																
H. rotulatum (Hedw.) Brid.	●	●	●	●	●	●	●	○	○	○	○	○	○	○	QVTSA	NZ, Oc, S Amer
[*H. didictyon* C. Muell., *H. novae-seelandiae* C. Muell.]																
LOPIDIUM Hook. f. & Wils.																
L. concinnum (Hook.) Wils.	○	●	●	●	●	●	○	○	○	○	○	○	○	○	VT	NZ, S Amer
[*L. plumarium* (Mitt.) Hampe, *Hypopterygium hyalino-limbatum* C. Muell. *nom. nud.*, *H. pallens* (Hook. f. & Wils.) Mitt.]																
70. FABRONIACEAE																
ANACAMPTODON Brid.																
A. wattsii Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
FABRONIA Raddi																
F. australis Hook.	○	●	★	●	○	●	●	○	●	●	○	★	★	○	QVTS-WA	NZ
[*F. tayloriana* Hampe. *F. hampeana* auct. non Sonder]																
F. brachyphylla C. Muell.	○	★	●	○	○	○	★	○	○	○	○	○	○	○	QA	
F. scottiae C. Muell.	○	●	●	●	○	○	○	●	●	●	○	○	○	○	Q	
ISCHYRODON C. Muell.																
I. lepturus (Tayl.) Schelpe	○	○	○	●	○	○	○	○	○	○	○	○	○	○	VSW	NZ, S Afr
[*I. seriolus* (C. Muell.) C. Muell., *Fabronia leptura* Tayl., *Juratzkaea leptura* (Tayl.) Buck]																
HELICODONTIADELPHUS Dix.																
H. australiensis Dix.†	○	○	○	○	○	★	○	○	○	○	○	○	○	○		
[*Eriodon cylindritheca* (Dix.) Dix. & Sainsb. ex Sainsb.]																

† Known only from specimens at E, NY, BM.

71. LESKEACEAE

PSEUDOLESKEA B.S.G.																
P. imbricata (Hook. f. & Wils.) Broth. [*P. calochlora* Broth. & Watts *Pseudoleskeopsis imbricata* (Hook. f. & Wils.) Ther.]	○	★	●	●	●	●	●	●	●	●	○	○	○	○	QVTSA	NZ

72. THUIDIACEAE

ANOMODON Hook. & Tayl.																
A. tasmanicus Broth.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VTSA	NZ
HAPLOHYMENIUM Dozy & Molk.																
H. pseudotriste (C. Muell.) Broth. [*H. brevinerve* (Broth.) Broth.]	○	●	●	○	○	○	○	○	○	○	○	○	○	○		NZ, As, Afr
THUIDIUM B.S.G.																
T. cymbifolium (Dozy & Molk.) Dozy & Molk. [*T. ramentosum* (Mitt.) Mitt.]	●	?	○	○	○	★	○	○	★	○	○	○	○	○	Q	As, Oc
T. furfurosum (Hook. f. & Wils.) Reichdt. [*Thuidiopsis furfurosa* (Hook. f. & Wils.) Fleisch., *Thuidium amblystegioides* C. Muell., *T. hastatum* (Mitt.) Reichdt., *T. suberectum* (Hampe) Jaeg., *T. unguiculatum* (Hook. f. & Wils.) Fleisch.]	●	●	●	●	●	●	●	●	○	●	○	○	○	○	QVTS-WA	S Hemis
T. furfurosum (Hook. f. & Wils.) Reichdt. var. **sparsum** (Hook. f. & Wils.) Sainsb.	○	○	○	●	★	○	●	○	★	○	○	○	○	○	A	
T. laeviusculum (Mitt.) Jaeg.	○	★	★	●	●	○	●	○	○	○	○	○	○	○	QVTA	NZ
T. liliputanum Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
T. nano-delicatulum (Hampe) Jaeg.	○	●	●	○	●	○	○	○	○	○	○	○	○	○	Q	
T. plumulosiforme (Hampe) Jaeg.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
T. protensulum C. Muell.	●	●	●	★	○	★	○	○	○	○	○	○	○	○	Q	
T. subglaucinum Card.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	A	As
T. trachypodioides Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		

73. AMBLYSTEGIACEAE	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
ACROCLADIUM Mitt.																
A. chlamydophyllum (Hook. f. & Wils.) C. Muell. & Broth. [*A. auriculatum* auct. non(Mont.) Mitt.]	○	★	○	○	★	○	●	○	○	○	○	○	○	○	VTSA	NZ, Subant I
AMBLYSTEGIUM B.S.G.																
A. austro-hygrophilum Broth.	○	○	○	○	●	○	○	○	○	○	○	○	○	○		
[Previous record not substantiated: *A. novae-valesiae* Broth. & Watts]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
CALLIERGON (Sull.) Kindb.																
C. stramineum (Brid.) Kindb.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
CALLIERGONELLA Loeske																
C. cuspidata (Hedw.) Loeske [*Acrocladium cuspidatum* (Hedw.) Lindb.]	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VTA	NZ, N Hemis, S Amer,
CAMPYLIUM (Sull.) Mitt.																
C. polygamum (B.S.G.) C. Jens.	○	○	★	○	○	○	★	○	○	○	○	○	○	○	VA	Cosmop
CRATONEUROPSIS (Broth.) Fleisch.																
C. relaxa (Hook. f. & Wils.) Fleisch. [*Campylium relaxum* (Hook. f. & Wils.) Broth.,*Campylium decussatum* (Hook. f. & Wils.) Broth., *Sciaromium elimbatum* Broth. & Watts, *S. forsythii* Broth.]	○	○	○	○	★	○	●	○	○	○	○	○	○	○	VTSA	NZ, S Afr
C. subrelaxa (Broth.) Broth. [*Campylium subrelaxum* (Broth.) Broth., *Amblystegium subrelaxum* Broth.]	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	
DREPANOCLADUS (C. Muell.) Roth.																
D. aduncus (Hedw.) Warnst. [*D. brachiatus* (Mitt.) Dix.]	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VTSA	Cosmop excl Oc, Eur. As, Afr, N Amer
D. exannulatus (B.S.G.) Warnst.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
D. fluitans (Hedw.) Warnst., also known as Warnstorfia fluitans (Hedw.) Loeske	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VTSA	Cosmop
D. fontinaloides (Hampe) Broth. ex Par. [*Amblystegium fontinaloides* (Hampe) Mitt.]	○	○	○	○	○	★	○	○	○	○	○	○	○	○		

D. uncinatus (Hedw.) Warnst., also known as Sanionia uncinatus (Hedw.) Loeske	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VTA	Cosmop
D. tundrae (Arn.) Loeske	○	○	○	○	○	○	★	○	○	○	○	○	○	○		Eur, As, Amer
LEPTODICTYUM (Schimp.) Warnst.																
L. riparium (Hedw.) Warnst.	○	●	★	○	●	○	●	○	★	○	●	○	○	○	VSA	NZ, N Hemis
[*L. muelleri* (Hampe & C. Muell.) Broth., *?Drepanocladus strictifolius* Broth. & Watts]																
74. BRACHYTHECIACEAE																
BRACHYTHECIUM B.S.G.																
B. albicans (Hedw.) B.S.G.	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTA	N Hemis
B. novae-valesiae Geh.	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
[Known only from type at BM]																
B. paradoxum (Hook. f. & Wils.) Jaeg.	○	○	○	○	★	○	●	○	○	○	○	○	○	○	VTA	NZ, S Afr, S Amer
B. plumosum (Hedw.) B.S.G.	○	●	●	○	○	○	●	○	○	○	○	○	○	○	A	Cosmop
[*B. pseudo-plumosum* (Brid.) Brockm.]																
B. rivulare B.S.G.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		N Hemis, S Afr
B. rutabulum (Hedw.) B.S.G.	○	○	●	★	●	●	●	○	○	○	○	○	○	○	VTSA	Cosmop
B. salebrosum (Web. & Mohr) B.S.G.	○	○	○	★	○	○	●	○	○	○	○	○	○	○	VTA	Cosmop
EURHYNCHIUM B.S.G.																
E. austrinum (Hook. f. & Wils.) Jaeg.	○	●	○	★	●	○	★	○	○	★	○	○	○	○	VTA	NZ, Subant I
[*Platyhypnidium austrinum* (Hook. f. & Wils.) Fleisch., *Oxyrrhynchium austrinum* (Hook. f. & Wils.) Broth.]																
E. cucullatum (Mitt.) Stone & Scott	○	●	★	○	○	○	○	○	★	★	○	○	○	○	QVT	
[*Rhynchostegiella cucullata* (Mitt.) Dix., *R. convolutifolia* (Hampe) Broth., *R. subconvolutifolia* Broth. & Watts]																
E. muriculatum (Hook. f. & Wils.) Jaeg.	●	●	★	○	○	★	★	○	○	○	○	○	○	○	VT	NZ
[*Rhynchostegiella muriculata* (Hook. f. & Wils.) Broth.]																
E. speciosum (Brid.) Jur.	○	★	○	★	★	?	○	○	○	○	○	○	○	○		Eur, As
[*Oxyrrhynchium speciosum* (Brid.) Warnst.]																
[Previous record not substantiated: *E. asperipes* (Mitt.) Dix.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		

74. BRACHYTHECIACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
OXYRRHYNCHIUM (B.S.G.) Warnst.																
O. howeanum Broth. & Watts	★	○	○	○	○	○	○	○	○	○	○	○	○	○		
RHYNCOSTEGIELLA (B.S.G.) Limpr.																
R. campylioides Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
RHYNCHOSTEGIUM B.S.G.																
R. sp. cf. **dentiferum** (Hampe) Jaeg.	○	○	○	○	○	★	○	○	○	○	○	○	○	○	VA	
R. laxatum (Mitt.) Par.	○	○	○	○	○	●	★	○	○	○	○	○	○	○	VTA	NZ
R. patulum Jaeg.	○	★	●	○	●	○	○	★	★	○	○	○	○	○	QV	
R. stramineoides (Sauerb.) Wijk & Marg. [*R. pseudo-stramineum* Mitt. *nom. illeg.*]	○	○	○	○	○	★	○	○	○	○	○	○	○	○		
R. tenuifolium (Hedw.) Reichdt. [*R. collatum* (Hook. f. & Wils.) Broth. & Watts, *R. subclavatum* (Hampe) Jaeg.]	●	●	●	●	★	●	●	○	●	★	○	○	○	○	QVTS-WA	NZ, As, S Amer
R. tenuifolium var. **howeanum** Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
75. ENTODONTACEAE																
ENTODON C. Muell.																
E. mackayensis C. Muell.	○	●	●	●	○	○	○	○	○	○	○	○	○	○	Q	
E. pancherianus (Besch.) Jaeg.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		Oc
76. PLAGIOTHECIACEAE																
PLAGIOTHECIUM B.S.G.																
P. denticulatum (Hedw.) B.S.G.	○	○	○	★	★	●	★	○	○	○	○	○	○	○	VT	Cosmop
P. novae-valesiae Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
77. SEMATOPHYLLACEAE																
MEIOTHECIUM Mitt.																
M. wattsii (Broth.) Broth. [*Pterogoniella wattsii* Broth.]	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	

PUNGENTELLA C. Muell.																
P. subfalcatulum (Broth. & Watts) C. Muell. [*Rhaphidorrhynchium subfalcatuhum* (Broth. & Watts) Broth., *Rhaphidostegium subfalcatulum* Broth. & Watts]	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
SEMATOPHYLLUM Mitt.																
S. aciculum (Dix.) Dix. [*Rhaphidostegium aciculum* Broth. ex Dix.]	●	●	●	★	○	●	★	★	★	○	○	○	○	○	Q	NZ
S. amoenum (Hedw.) Mitt. [*Rhaphidorrhynchium amoenum* (Hedw.) Fleisch., *Rhaphidostegium callidioides* (C. Muell.) Jaeg., *Rhaphidorrhynchium callidioides* (C. Muell.) Broth.]	★	○	●	○	★	●	●	○	○	○	○	○	○	○	QVTS-WA	NZ. S Amer
S. contiguum (Mitt.) Mitt. [*Rhaphidostegium contiguum* (Mitt.) Par.]	★	★	○	○	○	★	●	○	○	○	○	○	○	○	QVTSA	NZ, S Afr, S Amer
S. crassiusculum (Brid.) Broth. [*Rhaphidostegium crassiusculum* Brid.]	○	○	○	○	○	★	○	○	○	○	○	○	○	○		NZ, Afr, Amer
S. elachistos (Besch.) Broth.	○	○	★	●	○	○	★	○	○	○	○	○	○	○		Oc
S. homomallum (Hampe) Broth. [*Rhaphidorrhynchium homomallum* (Hampe) Mitt.,*Rhaphidostegium homomallum* (Hampe) Broth.]	○	○	●	●	○	★	★	○	○	○	○	○	○	○	?QVTS-W	NZ, As, Oc
S. jolliffii (Hook. f.) Dix. [*Rhaphidorrhynchium jolliffii* Hook. f.]	○	○	○	○	○	★	○	○	○	○	○	○	○	○	VT	NZ
S. luciduloides (Dix.) Mitt. [*Rhaphidostegium luciduloides* Dix.]	○	●	●	○	○	●	★	○	○	○	○	○	○	○		
S. uncinatum Stone & Scott [*Rhaphidorrhynchium tenuirostre* (Hook.) Broth., *Rhaphidostegium tenuirostre* (Hook.) Jaeg.]	○	○	○	○	●	○	○	○	○	○	○	○	○	○	VT	NZ, S Amer
S. wattsii (Par.) Broth. [*Rhaphidostegium wattsii* Par., *Rhaphidostegium micropyxis* Broth.]	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
TAXITHELIUM Spruce ex Mitt.																
T. novae-valesiae (Broth.) Broth. [*Isopterygium novae-valesiae* Broth.]	○	●	★	○	○	○	○	○	○	○	○	○	○	○	Q	
TRICHOSTELEUM Mitt.																
T. muscicolum Broth.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
WARBURGIELLA C. Muell.																
W. subleptorrhynchoides (Fleisch.) Fleisch.	○	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	Oc, As

77. SEMATOPHYLLACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
WIJKIA Crum																
W. extenuata (Brid.) Crum [*Acanthocladium extenuatum* (Brid.) Mitt., *A. crinitum* (Hook. f. & Wils.) Broth. in Par.]	●	●	●	●	●	●	●	○	○	○	★	○	○	○	QVTA	NZ, Oc
W. crossii (Broth.) Crum [*Acanthocladium crossii* (Broth.) Geh. ex Broth.]	●	★	○	○	○	○	○	○	○	○	○	○	○	○		
78. HYPNACEAE																
CTENIDIUM (Schimp.) Mitt.																
C. pubescens (Hook. f. & Wils.) Broth.	●	●	●	★	★	●	★	★	○	○	○	○	○	○	Q	NZ
ECTROPOTHECIUM Mitt.																
E. condensatum Broth. & Watts	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
E. howeanum Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
E. leucochloron (Hampe) Broth.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
E. umbilicatum (C. Muell.) Par.	★	●	●	○	○	★	○	○	○	○	○	○	○	○		Oc
E. sydneyense Dix. [Known only from Type in E (Dixon 1950)]	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
HYPNUM Hedw.																
H. chrysogaster C. Muell. [*Stereodon chrysogaster* (C. Muell.) Mitt.]	★	○	○	○	○	○	○	○	○	○	○	○	○	○	VT	NZ, S Amer, Subant I
H. cupressiforme Hedw. [*Stereodon cupressiformis* (Hedw.) Mitt., *S. walterianum* (Hampe) Jaeg.]	★	●	●	●	●	●	●	★	●	★	★	○	○	○	QVTS-WA	Cosmop
H. cupressiforme Hedw. var. **cupressiforme**	○	●	★	★	○	●	●	○	○	○	○	○	○	○	VTA	NZ, S Amer
H. cupressiforme Hedw. var. **lacunosum** Brid.	○	○	○	★	○	○	○	○	○	○	○	○	○	○	VTS	NZ, S Amer
H. cupressiforme Hedw. var. **filiforme** Brid.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VA	NZ, S Amer
H. cupressiforme Hedw. var. **mossmanianum** (C. Muell.) Ando [*H. mossmanianum* C., Muell. *Stereodon cupressiformis* (Hedw.) Brid. var. *mossmanii* Mitt., *Hypnum cupressiformis* Hedw. var. *mossmanii* Mitt. ex Par. *nom. inval.*]	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VTA	NZ, S Amer
H. subchrysogaster (Broth.) Par.	○	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	

ISOPTERYGIUM Mitt.																
I. albescens (Hook.) Jaeg.	●	●	●	○	○	○	○	○	○	○	○	○	○	○	QV	Oc, NZ. SE As
[*I. candidum* (C. Muell.) Jaeg., *I. molliculum* (Sull.) Mitt.]																
I. amblyocarpum (Hampe) Broth.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
I. amoenum Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
I. arachnoideum Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
I. howeanum Broth. & Watts	●	○	○	○	○	○	○	○	○	○	○	○	○	○		
I. latifolium Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
I. minutirameum (C. Muell.) Jaeg.	○	●	●	○	○	○	○	○	○	○	○	○	○	○	Q	As.Oc
[*I. austro-pusillum* (C. Muell.) Jaeg., ?*I. austro-subulatum* C. Muell. *nom. nud.]*																
I. pseudo-subulatum (C. Muell.) Par.	○	★	★	○	○	○	○	○	○	○	○	○	○	○		
I. subarachnoideum Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
VESICULARIA (C. Muell.) C. Muell.																
V. montagnei (Bel.) Broth.	●	○	○	○	○	○	○	○	○	○	○	○	○	○		As, Oc
V. reticulata (Dozy & Molk.) Besch.	○	○	?	○	○	○	○	○	○	○	○	○	○	○	Q	
V. rivalis Broth.	○	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	
V. slateri (Hampe) Broth.	○	●	○	○	○	○	○	○	○	○	○	○	○	○	Q	
[*Ectropothecium slateri* (Hampe) Jaeg.]																

81. BUXBAUMIACEAE

BUXBAUMIA Hedw.																
B. colyerae Burges	○	★	○	○	○	○	○	○	○	○	○	○	○	○	Q	

83. POLYTRICHACEAE

ATRICHUM P. Beauv.																
A. androgynum (C. Muell.) Jaeg. var. **androgynum**	★	○	●	★	●	●	●	○	○	○	○	○	○	○	QVTA	NZ, S&C Amer, S Afr
[*A. angustatum* var. *polysetum* Watts & Whitel. *nom. nud.*, *A. ligulatum* Mitt., *Catharinea leptocylindrica* C. Muell., *C. muelleri* C. Muell. & Hampe]																
POGONATUM P. Beauv.																
P. brachypodium (C. Muell.) Watts & Whitel.	○	○	★	○	○	★	○	○	○	○	○	○	○	○		
P. camarae (C. Muell.) Par.	○	○	○	○	○	★	○	○	○	○	○	○	○	○	Q	
P. subulatum (Brid.) Brid.	○	●	●	●	●	●	●	★	○	○	○	○	○	○	QVTA	NZ
[*P. australasicum* (C. Muell. & Hampe) Jaeg.]																

83. POLYTRICHACEAE (cont'd)	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
POLYTRICHADELPHUS (C. Muell.) Mitt.																
P. magellanicus (Hedw.) Mitt.	○	○	○	★	○	○	★	○	○	○	○	○	○	○	QVT	NZ, S Amer
[*P. innovans* (C. Muell.) Jaeg.]																
POLYTRICHASTRUM G.L. Smith																
P. alpinum (Hedw.) G.L. Smith	○	○	○	○	○	○	★	○	○	○	○	○	○	○	VTA	NZ, Cosmop
[*Polytrichum alpinum* Hedw.]																
POLYTRICHUM Hedw.																
P. brachypelma C. Muell.	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
P. cataractarum C. Muell.	○	○	○	★	○	○	○	○	○	○	○	○	○	○		
P. commune Hedw.	○	●	○	○	●	●	●	○	○	○	○	○	○	○	QVTA	Cosmop
P. juniperinum Hedw.	○	○	●	●	★	●	●	★	●	●	○	○	○	○	QVTSA	Cosmop
[*P. cypellomitrium* C. Muell., *P. ryparomitrium* C. Muell.]																
?P. piliferum Hedw.	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
[*P. sullivanii* Hampe]																
[Previous record not substantiated: *P. recurvipilum* C. Muell.]	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
PSILOPILUM Brid.																
P. australe Hook. f. & Wils.) Mitt.	○	○	○	○	○	○	●	○	○	○	○	○	○	○	VT	NZ, S Afr, Subant I
P. crispulum (Hook. f. & Wils.) Mitt.	○	○	○	○	○	★	●	○	○	○	○	○	○	○	VT	NZ
[*P. pyriforme* (Hampe) Jaeg.]																
84. DAWSONIACEAE																
DAWSONIA R. Br.																
D. longiseta Hampe	○	●	●	●	○	●	●	●	●	●	○	★	○	○	QVTSA	
[*D. appressa* Hampe, *D. victoriae* C. Muell.]																
D. polytrichoides R. Br.	★	●	●	●	●	●	○	○	○	○	○	○	○	○	QVT	NZ
D. superba Grev. var. **pulchra** (Wijk) Zant.	○	●	○	●	●	●	○	○	○	○	○	○	○	○	QVT	As, NZ
[*S. pulchra* Wijk, *D. intermedia* C. Muell. ex Schlieph. & Geh., *D. longifolia* (Brueh. & Schimp. in B.S.G.) Zant. var. *superba* Zant.]																

	LHI	C				T				WS				WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S		N	C	S		N	C	S		N	S	N	S		

	LHI	C				T				WS				WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S		N	C	S		N	C	S		N	S	N	S		

INDEX TO SYNONYMS

Acanthocladium crinitum (Hook. f. & Wils.) Broth. in Par. = Wijkia extenuata
A. crossii (Broth.) Geh. ex Broth. = Wijkia crossii
A. extenuatum (Brid.) Mitt. = Wijkia extenuata
Acaulon austro-muticum Geh. ex Roth = A. integrifolium
A. sullivanii C. Muell. = A. integrifolium
Acrocladium auriculatum auct. non (Mont.) Mitt. = A. chlamydophyllum
A. cuspidatum (Hedw.) Lindb. = Calliergonella cuspidata
Aloina ambigua (B.S.G.) Limpr. = A. aloides var. ambigua
Amblystegium subrelaxum Broth. = Cratoneuropsis subrelaxa
A. fontinaloides (Hampe) Mitt. = Drepanocladus fontinaloides
Andreaea amblyophylla C. Muell. ex Broth. = A. mutabilis
A. rupestris auct. non Hedw. = A. mutabilis
A. subulatissima C. Muell. = A. subulata
Anisothecium pycnoglossum Broth. = Dicranella pycnoglossa
A. jamesonii Mitt. = Dicranella jamesonii
Aongstroemia stackhousiana C. Muell. = Dicranella stackhousiana
A. rufo-aureum (Hampe) Willis = Ditrichum rufo-aureum
Aplodium lineare Mitt. = Orthodontium lineare
Archidium brisbanicum Broth. = Eecremidium brisbanicum
A. stolonaceum C. Muell. = Eecremidium pulchellum
Astomum brisbanicum (C. Muell.) Broth. = Trachycarpidium brisbanicum
A. cylindricum (Tayl.) Mitt. = Tetrapterum cylindricum
A. novae-valesiae Broth. ex Roth = Weissia novae-valesiae
A. viride C. Muell. = Pleuridium viride
A wattsii Broth. ex Roth = Trachycarpidium brisbanicum
Atrichum angustatum (Brid.) B.S.G. var. *polysetum* Watts & Whitel. = A. androgynum
A. ligulatum Mitt. = A. androgynum

Barbella trichophoroides (C. Muell.) Broth. = B. enervis
Barbula atro-virens (Sm.) Schimp. = Desmatodon convolutus
B. calycina Schwaegr. = Tortella calycina
B. pilifera (Hook.) Brid. = B. crinita
B. pseudopilifera C. Muell. & Hampe = B. crinita
B. rotundata Lindb. & Arn. = Bryoerythrophyllum rotundatum
B. subspiralis Hampe = B. hornschuchiana
Bartramia erecta (Hampe) Broth. = B. hampei
B. mossmanniana C. Muell. = B. halleriana
B. strictifolia Tayl. = B. stricta
Bartramidula hampei Mitt. = Bartramia hampei
Bescherelia cyrtopus F. Muell. = B. brevifolia
Blindia tenuifolia (Hook. f. & Wils.) Mitt. = B. robusta
Brachymenium chloroblastum Watts & Whitel. = B. preissianum
B. pilosithecium Watts & Whitel. = B. preissianum
Brachysteleum australe (Hampe) Jaeg. = Ptychomitrium australe
B. laxifolium C. Muell. = Ptychomitrium laxifolium
Brachythecium pseudo-plumosum (Brid.) Brockm. = B. plumosum
Breutelia communata Jaeg. = B. affinis
B. divaricata (Mitt.) Mitt. = B. pendula
B. fusco-aurea Broth. = B. pendula
B. sieberi Hornsch. ex C. Muell. = B. pendula
Bruchia amoena C. Muell. = Trematodon amoenum
B. whitcleggei C. Muell. = Eecremidium minutum
Bryobartramia robbinsii Sainsb. = B. novae-valesiae
Bryoerythrophyllum binsii (R. Br. ter.) Wijk & Marg. = B. jamesonii
Bryum abruptinervium C. Muell. = B. billardieri var. billardieri
B. acquicollum Broth. & Watts = B. dichotomum
B. affine Lindb. & Arn. = B. ereberrimum
B. amoenum Wright non Broth. = B. subfaseiculatum
B. appressifolium Broth. = B. australe
B. austro-affine Broth. = B. pseudotriquetrum
B. austro-alpinum C. Muell. = B. erassum
B. baileyi Broth. = B. nitens
B. bicolor Dicks. = B. pachytheca
B. binum (Brid.) Turn. = B. pseudotriquetrum
B. brachyaris C. Muell. in Mitt. = B. billardieri var. billardieri
B. brachytheciella C. Muell. = B. dichotomum
B. breviramulosum (Hampe) Mitt. = B. billardieri var. billardieri
B. brunneidens C. Muell. = B. billardieri var. billardieri
B. cheelii Broth. = B. muchlenbeckii
B. clavatum Hook. f. & Wils. = B. erythrocarpoides
B. crenatidens C. Muell. = B. billardieri var. billardieri
B. crispatum (Hampe) Mitt. = B. billardieri var. billardieri
B. curvicollum Mitt. = B. erythrocarpoides
B. dilatato-marginatum C. Muell. = B. subfaseiculatum
B. diversinerve Broth. & Watts = B. erythrocarpoides
B. erythropyxis C. Muell. = B. capillare ssp. torqueseens
B. filarium Broth. = B. erythrocarpoides
B. forsythii Broth. = B. billardieri var. billardieri
B. gambierense C. Muell. = B. pachytheca
B. globulare Hampe in C. Muell. = B. billiardieri var. billardieri
B. howeanum Broth & Watts = B. campylothecium
B. immarginatum Broth. = B. capillare
B. kiamae Broth. = B. erythrocarpoides
B. laxirete Broth. = B. caespiticium

B. leptopelma C. Muell. = B. chrysoneuron
B. leptothecioides Broth. & Watts = B. capillare
B. leptothecium Tayl. = B. billardieri var. billardieri
B. lochoneuron C. Muell. = B. chrysoncuron
B. microerythrocarpum C. Muell. & Kindb. = B. pachytheca
B. micropachypoma Broth. = B. nitens
B. microthecium C. Muell. = B. chrysoncuron
B. oblongifolium C. Muell. = B. blandum
B. olivaceum (Hampe) Mitt. = B. billardieri var. billardieri
B. pachypoma Mont. = B. plumosum
B. pachypomatulum Broth. = B. nitens
B. peraristatum C. Muell. = B. campylothceium
B. philonotideum Broth. & Watts = B. dichotomum
B. pimpanae C. Muell. = B. dichotomum
B. pohliaeopsis C. Muell. = B. billardieri var. billardieri
B. pusillum Broth. = B. capillare
B. pyrothecium C. Muell. & Hampe = B. capillare ssp. torquescens
B. robustum Hampe = B. billardieri var. billardieri
B. rufescens Hook. f. & Wils. = B. billardieri var. billardieri
B. subaeneum Hampe & C. Muell. = B. pachytheca
B. subatro-purpureum C. Muell. = B. coronatum
B. subcrispatum C. Muell. = B. billardieri var. billardieri
B. subcupulatum C. Muell. ex Rodw. = B. dichotomum
B. subcurvicollum Broth. = B. erythrocarpoides
B. suberythrocarpum C. Muell. = B. chrysoneuron
B. sublonginervium Geh. in Watts & Whitel. = B. capillare
B. subolivaceum C. Muell. = B. subfascieulatum
B. subpachypoma Hampe = B. nitens
B. subtomentosum (Hampe) Mitt. = B. billardieri var. billardieri
B. subventricosum Broth. = B. pseudotriquetrum
B. sullivanii C. Muell. = B. pachytheca
B. synoicum C. Muell. = B. capillare ssp. torquescens
B. tasmanicum Hampe = B. ereberrimum
B. viridulum C. Muell. = B. subfascieulatum
B. wattsii Broth. = B. chrysoncuron
B. whiteleggei Broth. = B. capillare

Calomnion laetum Hook. f. & Wils. = C. eomplanatum
Calymperes armatum Broth. = Syrrhopodon incompletus
Campylium relaxum (Hook. f. & Wils.) Broth. = Cratoneuropsis relaxa
C. decussatum (Hook. f. & Wils.) Broth. = Cratoneuropsis relaxa
C. subrelaxum (Broth.) Broth. = Cratoneuropsis subrelaxa
Camptochaete brisbanica C. Muell. = C. arbuseula var. deflexa
C. deflexa (Wils.) Jaeg. = C. arbuscula var. deflexa
C. ramulosa (Mitt.) Jaeg. = C. arbuseula

Campylopus appressifolius Mitt. = C. clavatus
C. institius Hook. f. & Wils. = C. clavatus
C. novae-valesiae Broth. = C. pallidus
C. pudicus (C. Muell.) Jaeg. = C. introflexus
C. tasmanicus Par. = C. introflexus
C. torquatus Mitt. = C. pallidus
C. woollsii (C. Muell.) Par. = C. pallidus
Catharinea leptocylindrica C. Muell. = Atrichum androgynum var. androgynum
C. muelleri C. Muell. & Hampe = Atrichum androgynum var. androgynum
Ceratodon convolutus Reichdt. = C. purpureus
C. stenocarpus Bruch. & Schimp. ex C. Muell. = C. purpureus
Cheilothela chilensis (Mont.) Broth. = Chrysoblastella chilensis
Conostomum australe Sw. = C. pentastichum
Cryphaea muelleri (Hampe) Broth. = C dilatata
C. brevidens C. Muell. = C. tenella
C. novae-valesiae C. Muell. = Papillaria flexicaulis
C. squarrulosa Hampe = C. ovalifolia
Cryphidium muelleri (Hampe) Broth. = Cryphaca dilatata
C. ovalifolium (C. Muell.) Broth. = Cryphaea ovalifolia
C. squarrulosum (Hampe) Broth. = Cryphaea ovalifolia
Cyathophorum pennatum (Labill.) Brid. = C. bulbosum
C. pteridioides P. Beauv. = C. bulbosum
Cyptodon dilatatus (Hook. f. & Wils.) Par. & Schimp. = Cryphaca dilatata
C. ovalifolius (C. Muell.) Fleisch. = Cryphaea ovalifolia
Cyrtopus bescherelloides C. Muell. = Bescherellia brevifolia

Dawsonia appressa Hampe = D. longiseta
D. intermedia C. Muell. ex Schlieph. & Geh. = D. superba var. pulchra
D. longifolia (Bruch. & Schimp. in B.S.G.) Zant. var. *superba* Zant. = D. superba var. pulchra
D. pulchra Wijk = D. superba var. pulchra
D. victoriae C. Muell. = D. longiseta
Desmatodon adustus Mitt. = Barbula hornschuchiana
Dichodontium wattsii (Broth.) Broth. = Dicranella eardotii
Distichophyllum leucoloma Broth. = D. longieuspis
Dicnemoloma sieberianum (Hornsch.) Broth. = Dienemoloma pallidum
Dicranella wattsii Broth. = D. cardotii
D. tricruris (C. Muell.) Mitt. = D. dietrichiae
Dicranoloma bartramioides (Broth.) Par. = D. menziesii
Dicranum dicarpum Nees = Dieranoloma dicarpum
D. sullivanii C. Muell. = Dicranoloma sullivanii
D. whiteleggei C. Muell. = Dicranoloma argutum
D. scoparium Hedw. ssp. *bonjeani* (De Not.) Grout = Dicranum bonjeanii

Didymodon rotundatus (Lindb. & Arn.) Par. = Bryoerthrophyllum rotundatum
Distichophyllum amblyophyllum (Hook. f. & Wils.) Mitt. = D. pulchellum
D. fissidentoides C. Muell. = D. rotundifolium
D. leucoloma Broth. = D. longicuspis
D. squarrosulum C. Muell. = D. rotundifolium
Ditrichum affine (C. Muell.) Hampe = D. difficile
D. baileyi C. Muell. = D. difficile
D. elongatum (Hook. f. & Wils.) Mitt. = D. cylindricarpum
D. flaccidulum C. Muell. in Watts & Whitel. = D. difficile
D. flexifolium Hampe = D. difficile
D. muelleri (Hampe) Hampe = D. difficile
D. setosum (Hook. f. & Wils.) Reichdt. = D. difficile
D. subbrachycarpum (C. Muell.) Par. = D. brachycarpum
Drepanocladus brachiatus (Mitt.) Dix. = D. aduncus
D. strictifolius Broth. & Watts = Leptodictyum riparium

Echinodium arboreum Broth. = E. hispidum
Ectropothecium slateri (Hampe) Jaeg. = Vesicularia slateri
Encalypta australis Mitt. = E. vulgaris
E. tasmanica Hampe = E. vulgaris
Entosthodon apophysata (Tayl.) Mitt. = Funaria apophysata
E. aristatus (Broth.) Par. = Funaria aristata
E. gracilis Hook. f. & Wils. = Funaria gracilis
E. smithurstii (Broth. & Geh.) Par. = Funaria smithurstii
E. squarrifolius (Broth.) Par. = Funaria squarrifolia
Ephemerum whiteleggei Broth. & Geh. = Eccremidium minutum
Eriopus apiculatus (Hook. f. & Wils.) Mitt. = Calyptrochaeta apiculata
Euptychium cuspidatum (Mitt.) Mitt. = E. setigerum

Fabronia hampeana auct. non Sondcr = F. australis
F. leptura Tayl. = Ischyrodon lepturus
F. tayloriana Hampe = F. australis
Fissidens brevifolius Hook. f. & Wils. = F. taylorii
F. dietrichiae C. Muell. = F. crassipes
F. elamellosus C. Muell. & Hampe = F. taylorii
F. macrodus Hampe = F. taylorii
F. muelleri (Hampe) Mitt. = F. fontanus
F. praemollis Broth. = F. crassipes
F. semilimbatus C. Muell. & Hampe = F. taylorii
F. whiteleggei C. Muell. ex Rodway = F. pallidus
Funaria calvescens Schwaegr. = F. hygrometrica
F. crispula Hook. f. & Wils. = F. glabra
F. hygrometrica Hedw. var. *sphaerocarpa* C. Muell. = F. hygrometrica
F. submuda Tayl. = F. glabra
F. tasmanica C. Muell. & Hampe = F. glabra

Glyphomitrium adamsonii Mitt. = Ptychomitrium australe
G. commutatum (C. Muell.) Broth. = Ptychomitrium australe
G. howeanum (Hampe) Broth. = Ptychomitrium muelleri
G. muelleri (C. Muell.) Broth. = Ptychomitrium muelleri
Goniobryum pellucidum (Mitt.) Broth. = G. subbasilare
Grimmia alpestris Sommerf. = G. donniana
G. apocarpa Hedw. = Schistidium apocarpum
G. campestris Burchell ex Hook. = G. laevigata
G. cygnicolla Tayl. = G. pulvinata var. africana
G. flexifolia Hampe = Schistidium rivulare ssp. rivulare
G. leiocarpa Tayl. = G. laevigata
G. leucophaea Grev. = G. laevigata
G. mutica Hampe = Schistidium apocarpum
G. pulvinata (Hedw.) Sm. var. *obtusa* (Brid.) Heub. = G. pulvinata var. africana
Gymnostomum calcareum (Nees) Hornsch. = G. aeruginosum

Haplohymenium brevinerve (Broth.) Broth. = H. pseudotriste
Hedwigia albicans Lindb. = H. ciliata
H. juratzkae C. Muell. = H. ciliata
H. microcyathea (C. Muell.) Par. = H. ciliata
Hedwigidium imberbe (Sm.) B.S.G. = Hedwigia integrifolia
H. integrifolium (P. Beauv.) Dix. = Hedwigia integrifolia
Holomitrium dietrichiae C. Muell. = H. perichaetiale
H. hodgkinsoniae C. Muell. = H. perichaetiale
H. muelleri Hampe = H. perichaetiale
H. whiteleggei C. Muell. = H. perichaetiale
Homalia acuminata C. Muell. = Thamnobryum pumilum
Hookeria karsteniana Broth. & Geh. = Cyclodictyon lepidum
Hypnodendron praenitens (Hampe) Mitt. = Pterobryella praenitens
Hypopterygium didictyon C. Muell. = H. rotulatum
H. hyalino-limbatum C. Muell. = Lopidium concinnum
H. novae-zeelandiae C. Muell. = H. rotulatum
H. pallens (Hook. f. & Wils.) Mitt. = Lopidium concinnum
H. scottiae C. Muell. = H. muelleri
Hypnodendron arcuatum non Hedw. = H. vitiense ssp. australe
H. arcuatum (Hedw.) Mitt. *pro parte* = H. spininervium ssp. archeri
H. whiteleggei C. Muell. ex Burges = H. vitiense ssp. australe
Hypnum cupressiformis L. var. *mossmanii* = H.cupressiforme var. mossmanianum
H. mossmanianum C. Muell. = H. cupressiforme var. mossmanianum

Ischyrodon seriolus (C. Muell.) C. Muell. = I. lepturus
Isopterygium austro-pusillum (C. Muell.) Jaeg. = I. minutirameum
I. austro-subulatum C. Muell. = I. minutirameum
I. candidum (C. Muell.) Jaeg. = I. albescens
I. novae-valesiae Broth. = Taxithelium novae-valesiae
I. molliculum (Sull.) Mitt. = I. albescens

Juratzkaea leptura (Tayl.) Buck = Ischyrodon lepturus

Lembophyllum brisbanicum C. Muell. = Camptochaete gracilis
L. clandestinum (Hook. f. & Wils.) Lindb. = L. divulsum
L. vagum (C. Muell.) Lindb. = Camptochaete vaga
Leptodictyum muelleri (Hampe & C. Muell.) Broth. = L. riparium
Leptodon australis C. Muell. = L. smithii
Leptodontium interruptum (Mitt.) non Broth. = L. paradoxum
Leucobryum brachyphyllum Hampe = L. candidum
L. speirostichum C. Muell. in Gch. = L. candidum var. pentastichum
L. spirostichum C. Muell. in Mitt. = L. candidum var. pentastichum
L. strictifolium Broth. = L. candidum
L. teysmannianum Dozy & Molk. = L. candidum
Leucoloma austro-scoparium C. Muell. ex Broth. = Dicranoloma argutum
L. dicarpum (Necs) Broth. = Dicranoloma dicarpum
L. sieberianum (Hornsch.) Jaeg. = Dicnemoloma pallidum
L. serratum Broth. = Dicranoloma serratum
Lopidium plumarium (Mitt.) Hampe = L. concinnum

Macromitrium asperulum Mitt. = M. ligulare
M. brevisetaceum Hampe = M. brachypodium
M. carinatum Mitt. = M. involutifolium ssp. ptychomitrioides
M. circinocladum C. Muell = M. diaphanum
M. daemelii C. Muell. = M. involutifolium
M. dimorphum C. Muell. = M. caloblastoides
M. eucalyptorum C. Muell. & Hampe = Macrocoma tenue ssp. tenue
M. geheebii C. Muell. = Macrocoma tenue ssp. tenue
M. ligulatulum C. Muell. = M. ligulaefolium
M. malacoblastum C. Muell. = M. involutifolium
M. microphyllum (Hook. & Grev.) Brid. = Macrocoma tenue ssp. tenue
M. novae-valesiae C. Muell. = Macrocoma tenue ssp. tenue
M. prolixum Bosw. = M. microstomum
M. pugionifolium C. Muell. = M. repandum
M pusillum Mitt. = M. archeri
M. rodwayi Dix. = M. longirostre
M. scottiae C. Muell. = M. microstomum
M. subbrevicaule Broth. & Watts = M. brevicaule
M. tasmanicum Broth. = M. microstomum
M. wattsii Broth. = M. brevicaule
M. weissioides C. Muell. = M. ligulare
M. weymouthii Broth. = M. microstomum
M. whiteleggei Broth. & Geh. = M. repandum
M. woollsianum C. Muell. = M. ligulaefolium
Meteorium amblyacis (C. Muell.) Mitt. = Papillaria amblyacis
M. dimorphum (C. Muell.) Mitt. = Pilotrichella dimorpha
M. intricatum Mitt. = Papillaria intricata
M. kermadecensis (C. Muell.) Mitt. = Papillaria crocea
M. trichophoroides (C. Muell.) Mitt. = Barbella enervis
Micromitrium brisbanicum (Broth.) Crosby = Eccremidium brisbanicum
Mielichhoferia ecklonii Hornsch. = M. bryoides
M. forsythii Broth. = M. australis
Mittenia rotundifolia (C. Muell.) Par. = M. plumula
Mniadelphis adnatus(Hook f. & Wils.) Reichdt.= Distichophyllum crispulum
M. amblyophyllus (Hook. f. & Wils.) Jaeg. = Distichophyllum pulchellum
M. crispulus (Hook. f. & Wils.) C. Muell. = Distichophyllum crispulum
M. subminutifolius Broth. & Geh. = Distichophyllum subminutifolium
Mniobryum albicans (Wahlenb.) Limpr. = Pohlia wahlenbergii
M. tasmanicum Broth. = Pohlia wahlenbergii
M. wahlenbergii (Web. & Mohr.) Jenn. = Pohlia wahlenbergii
Mniodendron comosum (Labill.) Lindb. = Hypnodendron comosum
Mnium rostratum auct. non Schrad. = Plagiomnium novae-zealandiae
M. longirostrum Brid. = Plagiomnium novae-zealandiae
M. novae-valesiae C. Muell. in Geh. = Plagiomnium novae-zealandiae

Nanomitrium brisbanicum (Broth.) Broth. = Eccremidium brisbanicum
Neckera hymenodonta C. Muell. = N. pennata

Orthodontium australe Hook. f. & Wils. = O. lineare ssp. sulcatum
O. ovale C. Muell. ex Broth. = O. inflatum
O. pallens (Hook. f. & Wils.) Broth. = O. lineare ssp. sulcatum
O. sulcatum Hook. f. & Wils. = O. lineare ssp. sulcatum
O. zetterstedtii C. Muell. = O. lineare ssp. sulcatum
Orthorrhynchium cymbifolioides C. Muell. = O. elegans
O. hampeanum C. Muell. = O. elegans
Orthotrichum acroblepharis C. Muell. = O. longithecum
O. campbelliae Watts & Whitel. = O. tasmanicum
O. encalyptaceum C. Muell. = O. tasmanicum
O. laterale Hampe = O. tasmanicum
O. sullivanii C. Muell. = O. rupestre
Oxyrrhynchium austrinum (Hook. f. & Wils.) Broth. = Eurhynchium austrinum
O. speciosum (Brid.) Warnst. = Eurhynchium speciosum

Papillaria cerina (Hook. f. & Wils.) Par. = P. flavolimbata
P. filipendula (Hook. f. & Wils.) Jaeg. = P. flexicaulis.
P. kermadecensis (C. Muell.) Jaeg. = P. crocea
P. nitidiuscula Broth. = P. nitens
P. scottiae (C. Muell.) Par. = P. flexicaulis
Phascum apiculatum Hook. f. & Wils. = Acaulon integrifolium
P. sullivanii C. Muell. = Tetrapterum sullivanii
P. tasmanicum Dix. & Rodw. = Acaulon crassinervium
Philonotis affinis (Hook.) Jaeg. = Breutelia affinis
P. appressa (Hook. f. & Wils.) Mitt. = P. scabrifolia
P. fertilis (Mitt.) Mitt. = P. tenuis
P. pseudomollis (C. Muell.) Jaeg. = P. tenuis
P. remotifolia (Hook. f. & Wils) Jaeg. = P. scabrifolia
Physcomitrella patens (Hedw.) B.S.G. var. *readeri* (C. Muell.) Tan = P. readeri
P. subserratum Hampe = P. conicum
Physcomitrium conicum Mitt. = P. pyriforme
Platylypnidium austrinum (Hook. f. & Wils.) Fleisch. = Eurhynchium austrinum
Pleuridium austro-subulatum Broth. ex Roth = Eccremidium brisbanicum
P. gracilentum (Mitt.) Mitt. = P. nervosum
Pogonatum australasicum (C. Muell. & Hampe) Jaeg. = P. subulatum
Pohlia erythrocaulis Watts & Whitel. = P. eruda
Polytrichadelphus innovans (C. Muell.) Jaeg. = P. magellanicus
Polytrichum alpinum Hedw. = Polytrichastrum alpinum
P. cypellomitrium C. Muell. = P. juniperinum
P. ryparomitrium C. Muell. = P. juniperinum
P. sullivanii Hampe = P. piliferum
Porotrichum arbusculum (Sm.) Mitt. = Camptoehaete arbuscula
P. clandestinum (Hook. f. & Wils.) Mitt. = Lembophyllum divulsum
P. vagum (C. Muell.) Mitt. = Camptochaete vaga
Pottia brachyodus (Hampe) Jaeg. = Desmatodon convolutus
Pseudoleskea calochlora Broth. & Watts = P. imbricata
Pseudoleskeopsis imbricata (Hook. f. & Wils.) Ther. = Pseudoleskea imbricata
Psilopilum pyriforme (Hampe) Jaeg. = P. crispulum
Pterobryon whiteleggei Broth. = Muellerobryum whiteleggei
Pterogoniella wattsii Broth. = Meiothecium wattsii
Pterygophyllum dentatum (Hook. f. & Wils.) Dix. = Aehrophyllum dentatum
P. hepaticaefolium (Hampe & C. Muell.) Jaeg. = Achrophyllum dentatum
P. nigellum (Hook. f. & Wils.) Mitt. = Achrophyllum dentatum
P. wattsii Broth. = Achrophyllum wattsii
Ptychomitrium adamsonii (Mitt.) Jaeg. = P. australe
P. commutatum (C. Muell.) Par. = P. muelleri
P. serratum (Mitt.) Hook. f. & Wils. *nom. illeg.* = P. mittenii

Racomitrium leptostomoides Forster = Racomitrium lanuginosum
R. sullivanii (C. Muell.) Broth. = Racomitrium crispulum
R. symphodon Jaeg. = Racomitrium crispulum
Racopilum convolutaceum (C. Muell.) Reichdt. = R. cuspidigerum var. convolutaceum
R. pacificum Besch = R. cuspidigerum var. cuspidigerum
R. strumiferum (C. Muell.) Mitt. = R. cuspidigerum var. convolutaceum
Rhacocarpus australis (Hook. f. & Wils.) Par. = R. purpurascens
R. humboldtii (Hook.) Lindb. = R. purpurascens
Rhaphidorrhynchium amoenum (Hedw.) Fleisch. = Sematophyllum amoenum
R. callidioides (C. Muell.) Broth. = Sematophyllum amoenum
R. homomallum (Hampe) Mitt. = Sematophyllum homomallum
R. jolliffii Hook. f. = Sematophyllum jolliffii
R. subfalcatulum (Broth. & Watts) Mitt. = Pungentella subfalcatulum
R. tenuirostre (Hook.) Broth. = Sematophyllum uncinatum
Rhaphidostegium aciculum Broth. ex Dix. = Sematophyllum aciculum
R. callidioides (C. Muell.) Jaeg. = Sematophyllum amoenum
R. contiguum (Mitt.) Par. = Sematophyllum contiguum
R. crassiusculum Brid. = Sematophyllum crassiusculum
R. homomallum (Hampe) Broth. = Sematophyllum homomallum
R. luciduloides Dix. = Sematophyllum luciduloides
R. micropyxis Broth. = Sematophyllum wattsii
R. subfalcatulum (Broth. & Watts) Broth. = Pungentella subfalcatulum
R. tenuirostre (Hook.) Jaeg. = Sematophyllum uncinatum
R. wattsii Par. = Sematophyllum wattsii
Rhizogonium gelhebii C. Muell. = R. distichum
R. graeffeanum (C. Muell.) Jaeg. = R. distichum
R. mnioides (Hook. f. & Wils.) Reichdt. = Pyrrhobryum mnioides
R. parramattense (C. Muell.) Reichdt. = Pyrrhobryum parramattense
R. spiniforme Hedw. = Pyrrhobryum spiniforme
Rhodobryum leucocanthum Hampe = Bryum leucocanthum
R. subfasciculatum Hampe = Bryum subfasciculatum
Rhynchostegiella convolutifolia (Hampe) Broth. = Eurhynchium cucullatum
R. cucullata (Mitt.) Dix. = Eurhynchium cucullatum
R. muriculata (Hook. f. & Wils.) Broth. = Eurhynchium muriculatum
Rhynchostegium collatum (Hook. f. & Wils.) Broth. & Watts = R. tenuifolium
R. pseudo-stramineum Mitt. = R. stramincoides
R. subclavatum (Hampe) Jaeg. = R. tenuifolium
R. muriculata (Hook. f. & Wils.) Broth. = Eurhynchium muriculatum

R. subconvolutifolia Broth. & Watts = Eurhynchium cucullatum

Schlotheimia baileyi Broth. = S. brownii
Sciaromium hispidum (Hook. f. & Wils.) Par. = Echinodium hispidum
Sclerodontium pallidum Hook. = Dicnemoloma pallidum
Sphagnum antarcticum Mitt. = S. australe
S. brotherusii Warnst. = S. falcatulum
S. commutatum Warnst. = S. molliculum
S. comosum C. Muell. = S. molliculum
S. cuspidatum Erh. ex Hoffm. = S. falcatulum
S. cymbifolioides C. Muell. = S. molliculum
S. decipiens Warnst. = S. cristatum
S. drepanocladum Warnst. = S. falcatulum
S. erythrocalyx auct. non Hampe = S. beccarii
S. grandifolium Warnst. = S. cristatum
S. magellanicum Brid. = S. cristatum
S. novo-zealandicum Mitt. = S. molliculum
S. perichaetiale Warnst. = S. australe
S. pseudo-rufescens Warnst. = S. molliculm
S. serratifolium Warnst. = S. falcatulum
S. subbicolor Hampe = S. cristatum
S. subcontortum Hampe = S. molliculum
S. subsecundum auct. non Nees =S. molliculum
S. wardellense Warnst. = S. cristatum
S. wattsii Warnst. = S. falcatulum
Spiridens muelleri Hampe = S. vicillardii
Sporledera minutissima (Dix. & Sainsb.) Sainsb. = Eecremidium whiteleggei
S. whiteleggei (C. Muell.) Broth. = Eccremidium minutum
Stereodon chrysogaster (C. Muell.) Mitt. = Hypnum chrysogaster
S. cupressiformis (Hedw.) Mitt. = Hypnum eupressiforme
S. cupressiformis (Hedw.) Brid. var. *mossmanii* Mitt. = Hypnum cupressiforme var. mossmannii
S. walterianus (Hampe) Mitt. = Hypnum cupressiforme
Syrrhopodon wattsii Broth. = Calymperopsis wattsii

Tayloria novae-valesiae (C. Muell.) Watts & Whitel. = T. octoblepharum
Thamnium effagellare Aongstr. = Thamnobryum pandum
T. gracillimum (Hampe) Broth. & Watts = Thamnobryum pumilum
T. pandum (Hook. f. & Wils.) Jaeg. = Thamnobryum pandum
T. pumilum (Hook. f. & Wils.) Lindb. = Thamnobryum pumilum

Thuidiopsis furfurosa (Hook. f. & Wils.) Fleisch. = Thuidium furfurosum
Thuidium amblystegioides C. Mucll. = T. furfurosum
T. hastatum (Mitt.) Reichdt. = T. furfurosum
T. ramentosum (Mitt.) Mitt. = T. cymbifolium
T. suberectum (Hampe) Jacg. = T. furfurosum
T. unguiculatum (Hook. f. & Wils.) Fleisch. = T. furfurosum
Tortella calycina (Schwaegr.) Dix. = Barbula calycina
T. nano-tortuosa (C. Muell.) Watts & Whitel. = T. knightii
T. subflavovirens Broth. & Watts = T. cirrhata
Tortula acuminata Brid. = Barbula unguiculata
T. asperifolia Broth. = T. crawfordii
T. atro-virens (Sm.) Lindb. = Desmatodon convolutus
T. austro-muralis (C. Mucll.) Broth. ex Par. = T. muralis
T. baileyi auct. non Broth. = T. pagorum
T. calycina (Schwaegr.) Hook. & Grev. = Tortella calycina
T. chlorotricha Broth. & Geh. = Barbula chlorotricha
T. flavinervis Dix. = Barbula crinita
T. melbourneana (C. Muell.) Broth. = T. muralis
T. pungens Hook. f. & Wils. = Barbula crinita
T. subcalycina (C. Muell.) Mitt. = Barbula subcalycina
T. sullivaniana (C. Muell.) Watts & Whitel. = Aloina sullivaniana
T. torquata (Tayl.) Wils. = Barbula torquata
Trachycarpidium novae-valesiae Broth. = Bryobartramia novae-valesiae
Trachyloma leptopyxis C. Muell. = T. diversinerve
Trachypus hornschuchii Mitt. = Papillaria croeca
Trematodon abruptus Watts & Whitel. = T. subereetus
T. adaequans Geh. ex Roth = T. suberectus
T. alpinus J.H. Willis = T. flexipes
Trichostomopsis australasiae (Hook. & Grev.) Robinson = Barbula australasiae
Trichostomum subdenticulatum C. Mucll. = Leptodontium viticulosoides

Webera nutans Hedw. = Pohlia nutans
W. tenuifolia Jaeg. = Pohlia tenuifolia
Weissia flavipes Hook. f. & Wils. = W. controversa
W. truncata C. Muell. = W. controversa
Whiteleggea australis (Broth.) Broth. ex Par. = Hampeella pallens
Wilsoniella compacta Geh. in Watts & Whitel. = Orthodontium inflatum

Zygodon brownii Schwaegr. = Z. intermedius

UNSUBSTANTIATED RECORDS OF RECOGNISED SPECIES

Unsubstantiated records of recognised species amongst Australian collections are included to enable checking to be carried out and possible locations of specimens in overseas Herbaria where early collections e.g. those of C. Müller may be deposited.

Fissidentaceae
Fissidens ampliretis *(C. Muell.) Broth.*
F. delicatulus *Aongstr. in Watts & Whitel.*
F. perangustatus *Broth.*

Dicranaceae
Dicranella stackhousiana *(C. Muell.) Broth.*
[*Aongstroemia stackhousiana* C. Muell.]
Dicnemoloma fraseri *(Mitt.) Ren.*
D. imbricatum *Broth. & Geh.*
D. strictipilum *(C. Muell.) Par.*

Encalyptaceae
Encalypta novae-valesiae *Hampe*

Pottiaceae
Tortula crawfordii *(Par.) Watts in Watts & Whitel.*
[*T. asperifolia* Broth.]
T. parramattana *Mitt.*
[*Barbula parramattana* (Mitt.) Kind.]

Funariaceae
Physcomitrium flaccidum *Mitt.*

Bryaceae
Bryum baeuerlenii *C. Muell.*
B. brachyeladulum *C. Muell.*
B. ischyrrhodon *C. Muell.*

Bartramiaceae
Breutelia baeuerlenii *(C. Muell.) Watts & Whitel.*
B. leptodontoides *(C. Muell.) Watts & Whitel.*
B. lonchopelma *(C. Muell.) Watts & Whitel.*

Ptychomniaceae
Glyphothecium perrotii *C. Muell.*

Neckeraceae
Thamnobryum (Thamnium) novae-valesiae *Kindb.*

Amblystegiaceae
Amblystegium novae-valesiae *Broth. & Watts*

Brachytheciaceae
Eurhynchium asperipes *(Mitt.) Dix.*

Polytrichaceae
Polytrichum recurvipilum *C. Muell.*

NOMINA NUDA

The purpose of listing *nomina nuda* is to encourage examination of the material to determine which names should be absorbed into the synonymy and which require validation as new species. The list includes only those names in literature (not names *in scheda*) which appear in Index Muscorum. The number of collections (>3 or ≤ 3) to which the name has been applied and the localities represented by these specimens are included to indicate whether the name has been widely used or not.

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o absent ● $>$ 3 collections ★ $\leq$ 3 collections

NOMINA NUDA	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
3. FISSIDENTACEAE																
Fissidens anisophyllus *Dix.*	○	○	○	○	★	○	○	○	○	○	○	○	○	○		
F. liliputano-incurvis *C. Muell.*	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
F. leptopelma *C. Muell.*	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
F. microblastus *C. Muell.*	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
F. pergracilis *Broth.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
F. woollsianus *C. Muell.*	○	○	★	★	○	★	○	○	○	○	○	○	○	○		
F. warningensis *Broth.*	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
8. DICRANACEAE																
Campylopus brevisetacea *Geh. in Watts & Whitel.*	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
Dicranella pellucida *Broth. in Watts & Whitel.*	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
Trematodon whiteleggei *Broth. in Watts & Whitel.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
9. DICNEMONACEAE																
Eucamptodon spinicuspis *Broth.*	●	●	○	○	○	○	○	○	○	○	○	○	○	○		
11. LEUCOBRYACEAE																
Leucobryum baileyanum *C. Muell.*	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
L. pseudocandidum *Broth.*	★	○	○	○	○	○	○	○	○	○	○	○	○	○		
14. POTTIACEAE																
Barbula aerophylla *C. Muell.*	○	○	○	○	○	○	●	○	○	○	○	○	○	○		
B. amoena *C. Muell.*	○	○	○	○	○	○	★	○	○	○	○	○	○	○		
B. austro-unguiculata *C. Muell.*	○	★	★	○	○	○	●	○	○	○	○	○	○	○		
B. glaucula *Broth.*	○	○	○	★	○	○	○	○	○	○	○	○	○	○		
B. nano-subulata *C. Muell. in Watts & Whitel.*	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
B. schizopogonacea *C. Muell.*	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
Desmatodon pachyneuroides *C. Muell.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
Gymnostomum scabridorsum *Broth.*	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
Hymenostomum amoenum *Geh. in Watts & Whitel.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
H. angustatum *Broth. in Watts & Whitel.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
H. robustum *Broth.*	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
H. subolivaceum *C. Muell. in Watts & Whitel.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		

Tortella angusticaulis *Watts & Whitel.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○
T. aristatula *Broth. in Watts & Whitel.*	○	●	○	○	○	○	○	○	○	○	○	○	○	○
Tortula brunnea *Broth. & Watts*	○	○	●	○	○	○	○	○	○	○	○	○	○	○
T. mollissima *Broth. in Watts & Whitel.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○
T. rotundata *Geh. in Watts & Whitel.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○
Triquetrella albieuspis *Broth. in Broth. & Watts*	○	○	○	○	○	○	●	○	○	○	○	○	○	○
Weissia tortelloides *Broth. in Watts & Whitel.*	○	●	○	○	○	○	○	○	○	○	○	○	○	○
W. whiteleggeana *C. Muell. in Watts & Whitel.*	○	○	●	○	○	●	○	○	○	○	○	○	○	○
19. FUNARIACEAE														
Funaria pilifera *(Mitt.) Broth.*	○	★	○	★	○	○	○	★	○	○	○	○	○	○
F. woollsianus *C. Muell. in Watts & Whitel.*	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Physcomitrium novae-valesiae *Broth. in Watts & Whitel.*	○	●	○	○	●	○	○	★	○	○	○	○	○	○
24. BRYACEAE														
Bryum leucoloma *Broth. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○
B. pseudotriquetrum *Broth. in Burg.*	○	○	○	○	○	○	★	○	○	○	○	○	○	○
B. subinclinatum *Watts & Whitel.*	○	○	○	○	○	★	○	○	○	○	○	○	○	○
B. subleptothecium *C. Muell.*	○	●	○	○	○	○	○	★	○	○	○	○	○	○
37. BARTRAMIACEAE														
Philonotis harrisii *Geh. in Watts & Whitel.*	○	●	●	●	●	●	●	○	●	★	○	○	○	○
P. fontanoides *Broth. & Watts*	○	○	○	○	○	○	★	○	○	○	○	○	○	○
P. micropteris *Broth. in Watts & Whitel.*	○	●	●	★	○	●	○	○	○	○	○	○	○	○
P. percapillaris *C. Muell. in Watts & Whitel.*	○	●	○	○	★	★	○	○	○	○	○	○	○	○
P. subsimplex *Watts & Whitel.*	○	○	○	○	★	○	○	○	○	○	○	○	○	○
P. uncinatula *C. Muell.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○
P. whiteleggei *Watts & Whitel.*	○	●	○	○	○	●	○	○	○	○	○	○	○	○
42. ORTHOTRICHACEAE														
Macromitrium hartmanii *C. Muell. ex Kindb.*														
M. richmondiae *Broth. in Watts & Whitel.*														
(*M. subhemitrichoides* Broth.)														
M. sheareri *Broth.*														
(*M. microblastum* Broth.)														
M. rupicola *C. Muell. in Watts & Whitel.*														

All specimens with these names have been examined and correctly identified by Vitt & Ramsay. These names remain as *nomina nuda.*

48. CRYPHAEACEAE														
Cryphaea viridissima *C. Muell.*	○	●	●	★	★	○	○	○	○	○	○	○	○	○
61. LEMBOPHYLLACAE														
Camptochaete deflexula *C. Muell. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○

NOMINA NUDA	LHI	C			T			WS			WP		FWP		EXTRA NSW	EXTRA AUST
		N	C	S	N	C	S	N	C	S	N	S	N	S		
65. HOOKERIACEAE																
Distichophyllum subflexuosum *Broth. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
D. wattsianum *Broth.*	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
70. FABRONIACEAE																
Fabronia novae-valesiae *Geh. in Burg.*	○	○	○	●	○	○	○	○	○	○	○	○	○	○		
71. BRACHYTHECIACEAE																
Rhynchostegium incurvum *Mitt.*	○	○	○	★	○	○	○	○	○	○	○	○	○	○		
72. THUIDIACEAE																
Thuidium atrovirens *C. Muell.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
T. erectum *Hampe in Mitt.*	○	○	○	○	★	○	○	○	○	○	○	○	○	○		
T. squallidiusculum *C. Muell. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
?T. sublilliputanum *Broth.*	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
73. AMBLYSTEGIACEAE																
Amblystegium campylopodioides *Broth. in Burg.*	○	○	○	○	○	○	●	○	○	○	○	○	○	○		
A. orbiculare *Jaeg.* (*Porotrichum orbiculare* Mitt.)	★	○	○	○	○	○	○	○	○	○	○	○	○	○		
76. PLAGIOTHECIACEAE																
Plagiothecium amblyostomum *C. Muell. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
P. howeanum *Jaeg.*	★	○	○	○	○	○	○	○	○	○	○	○	○	○		
77. SEMATOPHYLLACEAE																
Acanthocladium sericeum *Broth. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
Rhaphidostegium brachytheciella *C. Muell. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
R. calocarpum *C. Muell. in Burg.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
78. HYPNACEAE																
Hyocomium brachythecioides *Broth.*	○	★	○	○	○	○	○	○	○	○	○	○	○	○		
Hypnum pseudo-demissum *C. Muell.*	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
Isopterygium umbillicatum *Mitt.*	○	○	★	○	○	○	○	○	○	○	○	○	○	○		
I. viride-patens *C. Muell. in Burg.*	○	○	●	○	○	○	○	○	○	○	○	○	○	○		
Pylaisia pseudo-homomalla *Jaeg.*	○	●	●	★	★	○	○	○	○	○	○	○	○	○		

UNSUBSTANTIATED NOMINA NUDA

The following names have appeared in literature but no specimens have yet been located with these names.

Fissidentaceae
Fissidens applanatus *C. Muell.*
F. perangustus *C. Muell.*
F. porosus *Hampe*
F. whiteleggeanus *C. Muell.*
F. woollahrae *Broth.*

Dicranaceae
Holomitrium novae-valesiae *C. Muell. in Geh.*

Leucobryaceae
Leucobryum australe *Watts & Whitel.*

Funariaceae
Entosthodon euspidatus *Kiaer in C. Muell.*
Physcomitrium torqueseens *C. Muell.*

Bryaceae
Pohlia pseudopalleseens *Hampe in C. Muell.*

Bartramiaceae
Bartramia austro-alpina *C. Muell.*
Breutelia erawfordii *Watts & Whitel.*
B. luteola *C. Muell. ex Broth. in Geh.*
Philonotis austrolutea *C. Muell. in Jaeg.*
P. fontanoides *Broth. & Watts*

Lembophyllaceae
Porotrichum deeurvatum *Mitt.*

Brachytheciaceae
Rhynchostegium latifolium *Geh.*
R. obtusissimum *Geh.*
R. parramattense *Mitt.*

Sematophyllaceae
Aeanthoeladium maero-extenuatum *C. Muell. in Burg.*
A. pseudo-extenuatum *C. Muell. in Burg.*
A. sub-extenuatum *C. Muell. in Burg.*
Rhaphidostegium tingiringense *Geh. in Burg.*

Hypnaceae
Hypnum subextenuatum *C. Muell.*

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* Family number according to Crosby & Magill 1981.

PHYTOGEOGRAPHY OF THE MOSSES OF NEW SOUTH WALES

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(Aeeepted for publieation 29.3.1983)

ABSTRACT

Ramsay, Helen P. (School of Botany, University of New South Wales, Kensington, Australia 2033) 1984. Phytogeography of the Mosses of New South Wales. Telopea 2(5): 535-547. — The data on distribution of mosses in New South Wales eontained in a Census of New South Wales mosses (Ramsay 1984) are analysed in relation to intra- and extra-Australian distribution. Sixty-seven per eent of all moss families are represented in the State eovering 801,600 sq. km with a wide variety of elimate and topography. Some 527 speeies in 171 genera are present. Only 9 families that oeeur elsewhere in Australia are not represented. Seventy-seven per eent of the speeies are eonfined to the Southern Hemisphere: of these 55.5% are Australian 'endemies' of whieh 15.8% oeeur only in New South Wales. Less than half the speeies (43%) oeeur also in New Zealand. A list of possible endemies, many of whieh are represented by a few eolleetions only, and their distribution within the State, shows a eoneentration in the North and Central Coast. The preliminary nature of the survey is emphasised. It is likely that many of the species that are supposed endemies will be found to be more widespread and will be absorbed into synonymy when taxonomie revisions are made and more extensive field studies undertaken.

INTRODUCTION

The variety of forms in the interesting moss flora of New South Wales results from the diversity of habitat, elimate and altitude in an area of 801,600 sq. km (Cameron 1980). New South Wales lies between 151°E and 141°E longitude and from 37°S to 29°S latitude. Temperate to subtropical regions with elimatie variations dependent on temperature, rainfall and topography are present. The mean annual temperature ranges are greatest in the Southern Tablelands with the highest altitudes, and the Far West. Annual precipitation is highest along the North Coast (>1500 mm) and Southern Tablelands, deereasing from the eoast westwards to the arid western plains (<260 mm) (Fig. 3).

Anderson (1961, 1968) divided the State into four major eeogeographie divisions based on elimate and topography: 1. Coastal; 2. Tablelands; 3. Western Slopes; 4. Western Plains. The charaeteristies of these regions, summarised from Anderson, are outlined briefly here so that eorrelations ean be made between the distribution of mosses (Ramsay 1984a) and elimatie faetors. Jaeobs & Pickard (1981) used these divisions, with further modifieation, dividing the Western Plains into two regions — Western Plains and Far Western Plains. (For a map of New South Wales outlining these divisions see Figures 1 and 2.)

ECOGEOGRAPHIC REGIONS

1. Coastal

The eoastal region, with a coastline of 1,900 km, lies east of the Great Dividing Range. Average rainfall is greater than 635 mm per annum. Three subdivisions are reeognised — South, Central and North.

The South Coast (SC) eontains mainly *Eucalyptus* forests with some temperate rainforests in the gullies. The topography is undulating with rich soils.

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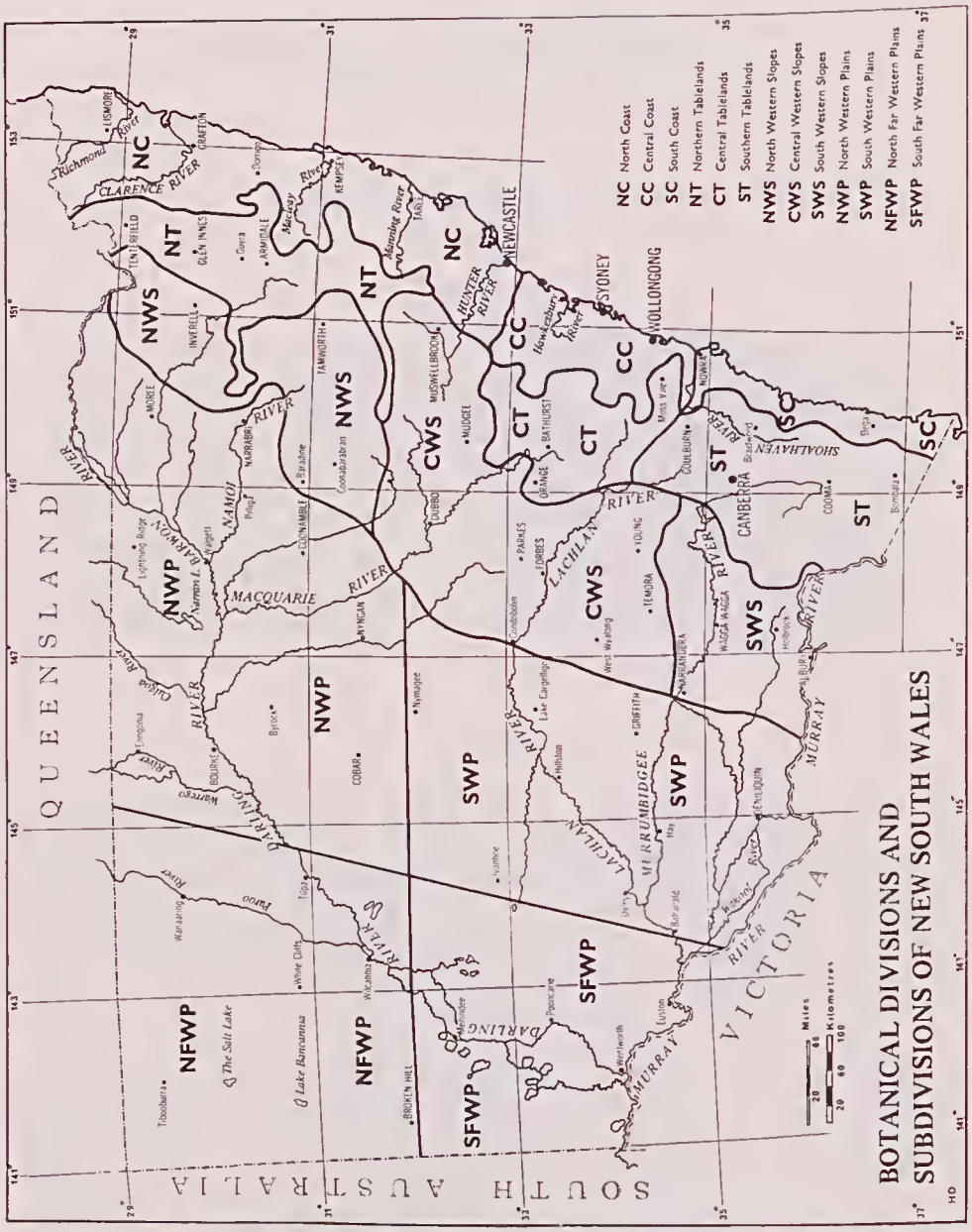

Fig. 1. Botanical divisions and subdivisions of New South Wales. (see Anderson, R.H. (1961). Introduction. *Contr. New South Wales Natl. Herb., Fl. Ser.* Nos 1-18, pp. 1-15.)

Conditions such as soil, topography, altitude and rainfall are much more variable in the Central Coast (CC), which encompasses the Sydney Plains and the lower Blue Mountains, rising to an altitude of 900 m. Rainfall varies from below the average mean (1,168 mm) to well above in the protected gullies of the lower Blue Mountains.

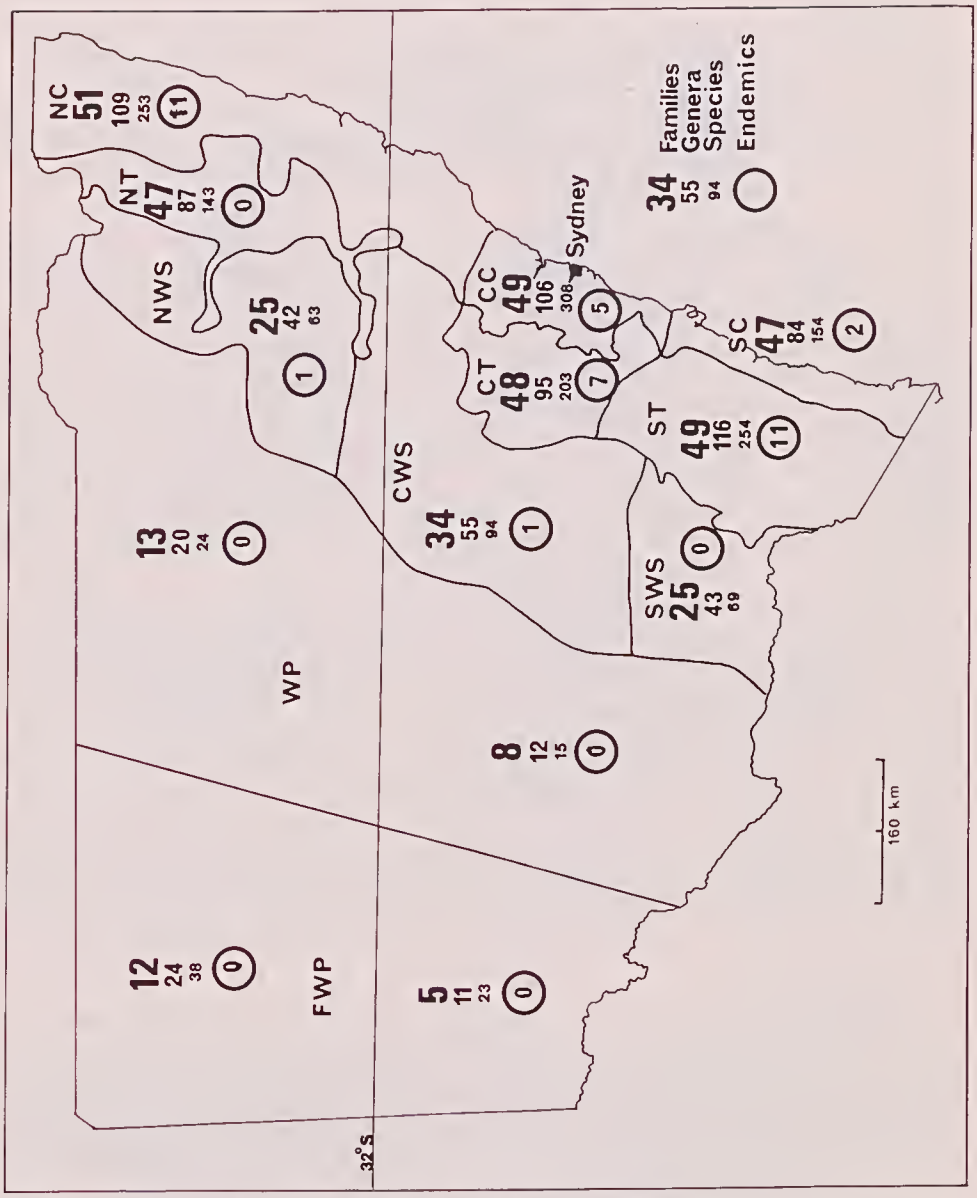

Fig. 2. Distribution of families, genera and species in New South Wales.

The North Coast (NC) becomes subtropical with higher rainfall (1,000 – 1,700 mm). Soil and forest types are much more varied in the north, including the eastern slopes of the Great Divide that rises to some 750 – 900 m. The vascular plants of the area include species with mainly southern temperate distribution as well as northern subtropical elements. The region on the Queensland – New South Wales border, including both North Coast and Northern Tablelands, in which these elements occur together, is referred to as the Macleay – McPherson overlap by Burbidge (1960).

2. Tablelands

The Tablelands can also be sub-divided into the Northern (NT), Central (CT) and Southern Tablelands (ST). The tablelands rise from a base altitude of 650 m in the south or 800 m in the north.

The Northern Tablelands is more uniform, consisting largely of plateaux up to 1,600 m high with granitic or basaltic soils and a rainfall from 800 to 900 mm per annum.

The Central Tablelands includes three different climatic areas: (a) The Bowral – Moss Vale area, altitude 650 – 850 m, has cold winters with heavy frosts, although snow occurs infrequently. Soils are derived from sandstone with some shale and basalt, while rainfall lies between 900 and 1,000 mm per annum and vegetation includes coastal tree species in the more sheltered valleys; (b) In the Blue Mountains, with altitudes up to 1,300 m, soils are mainly from sandstone with a few basalt outcrops. The region consists of heavily dissected plateaux with vegetation varying considerably from heath on exposed uplands to temperate rainforests in gullies. Rainfall is more variable — between 900 and 1,400 mm per annum. Affinities of tree species are with the eastern forms; (c) Slightly west of the Blue Mountains is an extension of the Tablelands (Orange–Bathurst district) with lower rainfall, 600–900 mm per annum, and granitic and basaltic soils. It is characterised by having western tree species.

The Southern Tablelands vary greatly in altitude and climate since Australia's highest mountain ranges occur here. The Australian Capital Territory (A.C.T.), containing Australia's capital city, Canberra, falls within the Southern Tablelands. A more detailed analysis of the A.C.T. is given in Ramsay & Streimann (1984). The Southern Tablelands may be subdivided into three areas — the eastern mountains, western mountains, and the central plateau connecting them. The western mountains include the Snowy Mountains with the tree-line at 1,920 m and its highest peaks exceeding 2,300 m. Rainfall ranges from 990 to 1,500 mm per annum with some months of snow during winter. The eastern mountains are thickly forested, while the central plateau in the Monaro–Goulburn area has cold winters and hot summers with low rainfall — 480 to 736 mm per annum. The low rainfall and heavy basaltic soils result in poor tree development in this section of the Southern Tablelands.

3. Western Slopes

The Western Slopes range in altitude down to 160 m in the south (SWS) and 270 m in the north (NWS). The northern, central (CWS) and southern areas of the slopes vary climatically with wide ranges in daily temperature and distribution of rainfall. In the north, rainfall is higher, up to 790 mm per annum, but mainly in summer. Rainfall up to 710 mm per annum is evenly distributed throughout the year in the central area, but occurs mainly in winter in the south with only 533 mm per annum where greater altitudinal variation occurs.

4. Western Plains

The Western Plains (NWP, SWP) have low average rainfall, 300 – 500 mm per annum, altitude below 160 m and extremes of temperature both daily and seasonally. In the Far Western Plains (FWP), precipitation is low in both the north (NFWP) and south (SFWP) with less than 260 mm per annum.

DISTRIBUTION OF MOSSES IN NEW SOUTH WALES

The distribution of mosses into the same subdivisions as Jacobs & Pickard (1981), to enable correlation with data for the Census of New South Wales Plants, is presented by Ramsay (1984a). Using the distribution data provided by this moss census, an analysis of families, genera and species occurring in these regions of New South Wales is presented in Table 1 and Figure 2.

Fig. 3. Annual precipitation in Australia (mm). (Adapted from Fig. 10-7, p. 96 of Linacre & Hobbs (1977). 'The Australian Climatic Environment'. (Wiley: New York.))

Knowledge of the distribution of mosses in Australia is not as advaneed as that in the Northern Hemisphere sueh as North Ameriea (Steere 1965, 1976, 1979; Ireland et al. 1980; Sehofield 1965, 1980) and Britain (Smith 1976); or South Afriea (Sim 1926; Magill & Sehelpe 1979) and New Zealand (Sainsbury 1955; Martin 1951) in the Southern Hemisphere. Indeed there are few published analyses of moss distributions in Australia, but Herzog (1926) mentions some Australian species, Scott & Stone (1976) inelude distributional data (by state) for many Australian speeies as well as lists of speeies with eeologieal preferenees, while Cateheside (1980) divides South Australia into 21 areas noting the area(s) in whieh eaeh of the 187 species deseribed is located and also provides a more detailed analysis of geographical relationships of the speeies (Cateheside 1982). Some information is also available for individual families, e.g. *Polytrichaceae* (Smith 1972); *Hypnodendraceae* (Touw 1971); *Hookeriaceae* (Weleh 1970); *Bryaceae* (Oehi 1970, 1972, 1973); *Hypnaceae* (Ando 1980); or genera sueh as *Bryum* (Mohamed 1979); *Hypnum* (Ando 1972); *Mittythyridium* (Nowak 1980); *Atrichum* (Nyholm 1971); *Macrocoma* (Vitt 1973); *Dawsonia* (van Zanten 1973), to mention a few, where worldwide revisions have been undertaken. In most eases, even when herbarium eollections from Australia have been studied, the distribution has not been determined from reeent field eollections and the data will, therefore, be ineomplete.

Species in New Zealand with bipolar disjunct distributions are discussed by Schofield & Crum (1972), and Schofield (1974, 1980), who include some Australian species in their treatments. Sixty-seven species (excluding those Schofield considers as introduced) are named as bipolar disjunctives (Schofield 1974). At least four of these — *Drepanocladus uncinatus, Neckera pennata, Aulacomnium palustre* and *Plagiothecium denticulatum* — occur in New South Wales. Van Zanten (1973, 1976, 1978), van Zanten & Pócs (1982) have studied the pattern of distribution of some Southern Hemisphere species in relation to long- range dispersal to explain disjunctions.

RELATIONSHIPS AND DISTRIBUTION PATTERNS

As in other regions of the industrialised world, the influence of man has resulted in irretrievable loss of many natural habitats, including areas rich in mosses, in New South Wales particularly with the destruction of much of the coastal rainforests. Remnants of these forests that persist are often too exposed for the epiphytic flora, which once thrived, to survive. The introduction of agriculture too, particularly with the addition of fertilizers and cultivation, may have altered the soil structure in previously forested areas so that mosses that may have existed naturally could have been eliminated or replaced by 'weeds' or widespread invaders of disturbed soils. As so little attention has been given to bryophytes by collectors and herbaria in Australia during our history, much detailed information, as regards the effects of European settlement, has already been lost. The early collectors (i.e. late 1800s, early 1900s) made a vital contribution as their specimens often represent the only examples from areas now denuded, e.g. specimens of Watts (see Ramsay 1980). There are also large gaps in our knowledge of mosses, indeed lower plants generally, as they have been included only rarely in publications such as ecological surveys or descriptions of vegetation types in Australia. Important exceptions in New South Wales are studies on the vegetation in the Snowy Mountains (Costin 1954, McVean 1969).

In spite of the many unsolved taxonomic problems in the moss flora of New South Wales and the very limited collecting in some areas, the information available gives some true indication of phytogeographical relationships of the species within the State.

The 56 families present contain 527 species in 171 genera. Sixty-seven percent of all moss families occur in New South Wales and these include all but 9 of the families that are found in Australia. Families not present in New South Wales are mainly tropical — Ephemeropsidaceae, Lepyrodontaceae, Myuriaceae, Pilotrichaceae, Trachypodaceae and Viridivellaceae. The Pleurophaseaceae and Leucomiaceae are southern temperate families. The family Archidiaceae was thought not to be represented in N.S.W., but one species has now been located (I.G. Stone, pers. comm.). Much work still remains to be done. In addition to the 527 species for which specimens have been located, literature records for 22 species for which no specimens have yet been located, and 81 invalid names reported as *nomina nuda* in Index Muscorum and Supplements (Wijk et al. 1959-1969; Crosby 1977, 1979; Crosby & Bauer 1981) have yet to be clarified.

Only 23% of species have a distribution extending into the Northern Hemisphere, the remaining 77% being found only in the Southern Hemisphere. Of these latter, 55.5% are confined to Australia with 15.8% of these apparently restricted to New South Wales.

Sixty per cent of species have affinities with the temperate southern states — Victoria, Tasmania, South Australia — while 40% are related to tropical Queensland species. Less than half the species, 43% only, are found also in New Zealand where the moss flora is more closely allied to Victorian and Tasmanian taxa. While species 'endemism' is high in the area, no genera or families occur in

TABLE 1. FREQUENCY OF DISTRIBUTION OF MOSSES IN NEW SOUTH WALES
(abbreviations for localities explained on p.459).

SPECIES %/locality	GENERA %/locality	FAMILIES %/locality
58.0 CC	67.0 ST	91.0 NC
48.0 NC, ST	63.4 NC	87.5 CC, ST
38.3 CT	61.6 CC	85.7 CT
29.0 SC	55.2 CT	84.0 SC, NT
27.0 NT	50.6 NT	60.7 CWS
18.0 CWS	48.8 SC	44.6 NWS, SWS
13.0 SWS	32.0 CWS	23.2 NWP
12.0 NWS	25.0 SWS	21.4 NFWP
7.2 NFWP	24.4 NWS	14.3 SWP
4.5 SFWP, NWP	14.0 NFWP	9.0 SFWP
2.8 SWP	11.6 NWP	
	7.0 SWP	
	6.4 SFWP	
	Total number of species	527*
	Total number of genera	171
	Total number of families	56

* This total does not include 22 unsubstantiated records for described species nor 93 names in literature (nomina nuda) that include 23 for which no specimen has been located in Australian herbaria.

the New South Wales moss flora which do not have an extra-Australian distribution.

The summary of distribution of mosses within New South Wales (Fig. 2 and Table 1) shows the highest family, generic and species numbers in three subdivisions — Central Coast (CC), North Coast (NC) and Southern Tablelands (ST). Although quite dissimilar, these regions offer the greatest diversity of climate, soils and topography. All have variations in altitude, this being most significant in the Southern Tablelands. Lowest species, generic and family numbers occur, as expected, in low rainfall divisions (WP and FWP) with less than 260 mm per annum and little altitudinal or habitat variation. The paucity of mosses in these areas may be due, in part, to under-collection as many are ephemeral. This has been demonstrated by recent collections from I.G. Stone (pers. comm.) who has increased the number of species in the Far North Western Plains from 8 to 38, and genera from 8 to 24. Professor D.G. Catcheside (1980, pers. comm.) has also provided information on new species collections from the arid areas in New South Wales. Other subdivisions with high diversity of forms (CT, SC, NT) all contain either dissected plateaux or valleys in the foothills of ranges that provide a broad range of suitable habitats for bryophytes.

NORTHERN HEMISPHERE DISJUNCTS

In a discussion of mosses with bipolar distribution in North America, Schofield (1980) mentions the possibility that many were introduced unintentionally by man and thus occur widely in anthropogenic habitats. Of those listed as possibly introduced in North America (p.155), the following occur in New South Wales: *Barbula unguiculata, Brachythecium albicans, Calliergonella (Acrocladium) cuspidata, Hypnum cupressiforme, Pottia truncata, Aulacomnium palustre, Drepanocladus fluitans, Polytrichum commune, Andreaea rupestris, Grimmia laevigata, G. pulvinata, Hedwigia ciliata, Pohlia cruda, Leptodon smithii, Neckera pennata, Ceratodon purpureus, Distichium capillaceum, Leptobryum*

pyriforme, Pohlia wahlenbergii. In addition, those species present in N.S.W. but not listed above that are common inhabitants of concrete walls in cities (Schofield 1980: 166) are *Bryum argenteum, B. capillare, B. dichotomum, Tortula muralis, T. pagorum* and *T. papillosa.* The latter two species of *Tortula,* however, are more commonly epiphytic on trees here, both on natives (*Eucalyptus* spp.) and exotics (*Quercus, Populus,* etc.). Since *Tortula papillosa* reproduces sexually only in Australasia, it is unlikely that it has been introduced here recently by man and indeed, little is known in Australia about which species have been introduced.

Other New South Wales species that have Northern Hemisphere affinities are several *Sphagnum* species, *Weissia controversa, Funaria hygrometrica, Fissidens asplenioides, F. crassipes, Bryum muehlenbeckii, B. pachytheca, B. torquescens, Orthotrichum rupestre, Brachythecium rutabulum, B. rivulare, B. salebrosum, Plagiothecium denticulatum, Polytrichastrum* (*Polytrichum*) *alpinum* and *Polytrichum juniperinum.*

Some species that are not so widespread as to be considered cosmopolitan occur in some regions of the Northern Hemisphere extending also to North and Central America or Asia, mainly SE Asia, e.g. *Acaulon triquetrum* (Eur, N Afr, N Amer), *A. aloides* (Eur, As, N Amer, Afr), *Encalypta vulgaris* (N Amer, As, Afr, NZ), *Thamnobryum pandum* (SE Asia), *Glyphothecium sciuroides* (SE Asia), *Hampeella pallens* (SE Asia), *Meesia triquetra* (N Hemis). But many species occurring in Australia and SE Asia often extend in range into Oceania or South America as well.

SOUTHERN HEMISPHERE DISTRIBUTIONS

The wider distributions of species found in N.S.W. fall into several categories:

(a) Subantarctic elements (Australia/New Zealand/South America)
(b) Malesian elements (N. Australia/Papua New Guinea/Indonesia/SE Asia)
(c) Oceania–Pacific elements (New Caledonia/Norfolk Island/Hawaii/New Hebrides/New Zealand and other Pacific Islands)
(d) African elements.

The relationships of New South Wales mosses to other southern continents tend to be either to Africa or South America and only infrequently to both, while only a small number of New South Wales species occur in the three continents. Those which do have a circum-austral range come from widely different families, e.g. Pottiaceae (*Barbula australasiae, B. crinita*), Sphagnaceae (*Sphagnum australe*), Ditrichaceae (*Pleuridium nervosum*), Dicranaceae (*Dicranoloma billardieri*), Bryaceae (*Orthodontium lineare*), Aulacomniaceae (*Leptotheca gaudichaudii*), Bartramiaceae (*Breutelia pendula, Conostomum pentastichum*), Phyllogoniaceae (*Catagonium politum*), Hookeriaceae (*Achrophyllum dentatum*), Brachytheciaceae (*Brachythecium paradoxum*) and Sematophyllaceae (*Sematophyllum contiguum*).

(a) Subantarctic elements

Species that extend across to South America but are not distributed through the Pacific Islands, except sometimes New Zealand, occupy many varied habitats, — from ground mosses, e.g. *Fissidens rigidulus, Polytrichadelphus magellanicus,* to epiphytes growing close to the ground on tree trunks or on fallen logs and rocks, e.g. *Dicranoloma menziesii, Weymouthia mollis.* All come from moist habitats rather than arid ones and consist of one or two species in a wide range of families, e.g. Fissidentaceae, Dicranaceae, Seligeriaceae, Pottiaceae, Orthotrichaceae, Meteoriaceae, Hookeriaceae, Lembophyllaceae, Sematophyllaceae, Polytrichaceae.

(b) Malesian elements

Species in N.S.W. that have wider distributions to the northern tropical regions of Malesia (New Guinea, Indonesia and SE Asia) are found in families such as

Orthotrichaceae, Ptychomniaceae, Phyllogoniaceae, Meteoriaceae, and Rhizogoniaceae and Spiridentaceae, but their numbers are small.

(e) **Oceania-Pacific elements** (including New Zealand)

There are some fourteen species that occur in New South Wales whose distribution is restricted to New Zealand and Oceania. Many of these are epiphytic and from subtropical or temperate rainforests, e.g. *Holomitrium perichaetiale, Leucobryum candidum, Leptostomum macrocarpum, Hymenodon pilifer, Braithwaitea sulcata, Macromitrium* spp., *Papillaria* spp., *Wijkia extenuata*. The few that extend further, e.g. to South America, occur in damp habitats, principally on creek banks, waterfalls, etc., e.g. *Goniobryum subbasilare, Ptychomnion aciculare* and *Hypopterygium rotulatum*.

The geographical range of mosses from Lord Howe Island (politically a part of New South Wales) is considered separately (pages 549-558). Its moss flora, as known at present, contains about 26% endemics; a further 37.5% are confined to Australia and New Zealand and 10% extend across the Pacific to South America.

(d) African elements

Mosses that have an extra-New South Wales distribution extending westwards to Southern Africa (Magill & Schelpe 1979) include a number of small ground mosses, e.g. *Eccremidium exiguum, Bruchia brevipes, Bryobartramia novae-valesiae, Gigaspermum repens,* whose distribution in Australia is primarily in arid habitats (Catcheside 1980, 1982). The 17 species that have such affinities come from widely different families, e.g. Fissidentaceae (*Fissidens tenellus*), Dicranaceae (*Campylopus bicolor*), Polytrichaceae (*Psilopilum australe*).

ENDEMISM

About 90 of the species are apparently limited in distribution to New South Wales. This number is probably an exaggerated estimate of 'endemics' since it is likely that some species will be reduced to synonymy once Australia-wide or worldwide revisions of the genera in which these species occur have been undertaken. The names are arranged in family sequence from Census of New South Wales mosses (Ramsay 1984a) in Table 2. Quite a number of species previously considered endemic have been absorbed into synonymy already as predicted by Watts (see Ramsay 1980).

From Figure 1 and Table 2 it is clear that the subdivisions in New South Wales with the greatest numbers of such species endemic to an area are the North Coast (11), Central Coast (5) and Southern Tablelands (11). Some of the possible endemics have a much wider intrastate distribution. In all, 35 of these so-called 'endemics' are found in the North Coast, 26 in the Central Coast and 19 in the Southern Tablelands (Table 2). Although the North Coast and Southern Tablelands may be regions where, because of climatic or geological disturbance, their past history has provided the geographical isolation necessary for endemism, the more likely explanation is that these areas or species have not been investigated in enough detail.

We know nothing of the origins or past history of bryophytes in Australia, the effects of glaciation, where this occurred, fire frequency or the dispersal pathways followed during climatic changes. In particular, the North Coast endemics need careful comparison with Queensland species before any clear understanding of the significance or extent of endemism can be assessed. For example, the apparent disjunct distribution of two endemics, *Pleuridium brachycaulon* (Central Coast, North Western Slopes) and *Astomum novae-valesiae* (Central Coast, Southern Tablelands), may be due to paucity of collecting as they are both small ground mosses.

TABLE 2. SPECIES APPARENTLY ENDEMIC TO N.S.W. & THEIR DISTRIBUTION
(rare = ≤3 collections) [List excludes LHI endemics recorded in Ramsay 1984c]

SPECIES	DISTRIBUTION (for key to abbreviations see p.459)
ANDREAEACEAE	
Andreaea tenera C. Muell.	CT
FISSIDENTACEAE	
Fissidens aristatus Broth.	C
F. bryoidioides Broth.	CC (rare)
F. forsythii Broth.	NC, NT (rare in both)
F. homomallulus C. Muell. ex Dix.	NC, CC
F. montecollii Broth. & Watts	NC
F. sordidevirens Broth.	NC, CC
F. wattsii Broth.	LHI, CC
DITRICHACEAE	
Pleuridium curvisetum Stone	ST
P. viride (C. Muell.) Kindb.	CC
DICRANACEAE	
Campylopis denticuspis Broth. var. *lutescens* Broth.	CC
C. perauriculatus Broth.	NC, SC
Dicranella apophysatula (C. Muell.) Broth.	NC (rare)
LEUCOBRYACEAE	
Leucobryum subchlorophyllosum Hampe	NC (rare)
L. turgidulum C. Muell.	CT (rare)
CALYMPERACEAE	
Calymperopsis wattsii (Broth.) Fleisch.	NC
POTTIACEAE	
Barbula speirostega C. Muell.	CT (rare)
Didymodon wildii (Broth.) Broth.	NWP (rare)
Hymenostomum olivaceum C. Muell. ex Geh.	NC, CC, NT, CT, NWS
H. sullivanii C. Muell. ex Geh.	NT, CWS (rare in both)
Tetrapterum sullivanii (C. Muell.) Broth.	NC
Tortella novae-valesia Broth.	NC, CC (rare in both)
Tortula evanescens Broth.	CWS (rare)
T. panduraefolia (C. Muell. & Hampe) Broth.	CC, T, NWS, CWS, NWP, (rare in all but CC)
T. readeri (C. Muell.) Broth.	NWS (rare)
T. streptopogoniacea (C. Muell.) Broth.	NC (rare), WS (rare), CT
T. subbrunnea Broth. & Watts	ST (rare)
T. vesiculosa (C. Muell.) Broth.	CC, T (rare in ST), CWS, SWS
Trichostomum aristatulum Broth.	NC (rare)
Weissia novae-valesiae (Broth. ex Roth) Stone	CC, ST (rare)
W. perpusilla Stone	CC
GRIMMIACEAE	
Racomitrium pseudo-patens (C. Muell.) Par.	ST
FUNARIACEAE	
Funaria sphaerocarpa C. Muell.	NC, CT, ST, LHI
F. squarrifolia Broth.	NC
Physcomitrium integrifolium Hampe & C. Muell.	ST (rare)
SPLACHNACEAE	
Splachnobryum wattsii Broth.	CC
Tayloria maidenii Broth.	ST, NWS
BRYACEAE	
Bryum aeruginosum C. Muell.	CC
B. bateae C. Muell.	SC
B. calodictyon Broth.	CWS
B. plumosum Dozy & Molk.	NC
B. subapiculatum Hampe	ST
Mielichhoferia turgens Broth.	CWS, SWS (rare)
Pohlia austro-carnea Broth.	CC (rare)
BARTRAMIACEAE	
Bartramia timmioides C. Muell.	CC (rare)
Brcutellia pseudo-philonotis (C. Muell.) Watts & Whitel.	CC
Philonotis austro-falcata Broth. & Watts	ST (rare)
P. pseudomollis (C. Muell.) Jaeg.	NC, CC, CWS

TABLE 2 (cont'd)

PTYCHOMITRIACEAE	
Ptychomitrium laxifolium (C. Muell.) Par.	C, NT, NWS (rare in latter two)
ORTHOTRICHACEAE	
Schlotheimia funiformis Tayl. ex Dix.	CC (rare)
METEORIACEAE	
Pilotrichella dimorpha (C.Muell.) Jaeg.	NC, CT (rare in both)
LEMBOPHYLLACEAE	
Camptochaete excavata (Tayl.) Jaeg.	C
C. schlosseri (Sendtn.) Broth. ex Par.	NC (rare)
HOOKERIACEAE	
Achrophyllum wattsii (Broth.) Vitt & Crosby	NC
Distichophyllum minutifolium C. Muell.	CC, CT
D. subminutifolium (Broth. & Geh.) Fleisch.	ST (rare)
D. whiteleggeanum C. Muell.	CT (rare)
FABRONIACEAE	
Anacamptodon wattsii Broth.	NC (rare)
Helicoantiadelphus australiensis Dix.	CT (rare)
AMBLYSTEGIACEAE	
Amblystegium austro-hygrophilum Broth.	NT
Calliergon stramineum (Brid.) Kindb.	ST (rare)
Cratoneuropsis subrelaxa (Broth.) Broth.	ST
Drepanocladus fontinaloides (Hampe) Broth. ex Par.	CT (rare)
BRACHYTHECIACEAE	
Brachythecium novae-valesiae Geh.	CC (rare)
Rhynchostegium straminioides (Sauerb.) Wijk & Marg.	CT (rare)
PLAGIOTHECIACEAE	
Plagiothecium novae-valesiae Broth.	NC
SEMATOPHYLLACEAE	
Sematophyllum leiodoloides (Dix.) Mitt.	NC, CC, CT, ST (rare)
S. wattsii (Par.) Broth.	NC
Wijkia crossii (Broth.) Crum	LHI, NC (rare)
HYPNACEAE	
Ectropothecium condensatum Broth. & Watts	ST (rare)
E. sydneyense Dix.	CC (rare)
Isopterygium amblyocarpum (Hampe) Broth.	ST (rare)
I. amoenum Broth.	NC (rare)
I. arachnoideum Broth.	NC
I. latifolium Broth.	NC (rare)
I. pseudo-subulatum (C. Muell.) Par.	NC, CC (rare in both)
I. subarachnoideum Broth.	NC (rare)
BUXBAUMIACEAE	
Buxbaumia colyerae Burges	NC (rare)
POLYTRICHACEAE	
Pogonatum brachypodium (C. Muell.) Watts & Whitel.	CC, CT (rare in both)
Polytrichum brachypelma C. Muell.	CC (rare)
P. cataractarum C. Muell.	SC (rare)

CONCLUSION

Even such a preliminary analysis as this has been able to show some interesting features of the wider distribution of New South Wales mosses, as well as their intrastate dispersion. In considering the latter, several factors need to be taken into account in each area under consideration, e.g. its size, ecogeographic features and the extent of collecting carried out, as a measure of reliability of distribution data. It is important that specific areas should be more intensively studied, as has been done for the Australian Capital Territory (Ramsay & Streimann 1984). Some progress is being made towards inclusion of moss species in vegetation surveys within some National Parks (G. Harden, pers. comm.; I.G. Stone, pers. comm.). This should continue but is dependent on access to trained bryologists for identification of specimens.

Other areas of study that would be valuable for detailed analysis are the alpine regions of New South Wales and Victoria, and the MacPherson–Macleay overlap (Burbidge 1960) on the border of New South Wales and Queensland. This district contains some of the few remaining areas of rainforest in Australia and has been considered of great botanical interest. The mix of two types of rainforest — that with elements related to the Indo-Malayan flora and the other with Antarctic elements — in this border region provides a unique opportunity for study (Hitchcock 1979). Recent analysis of the Australian flora and its origins has led Webb & Tracey (1980) to suggest that re-interpretation is needed. They put forward the hypothesis that Australia contains the ancient elements of tropical angiosperm species now present in the Indo-Malayan region, rather than more recent immigrants as previously thought. Australia is indeed an ancient refuge for primitive angiosperms as evidenced by recent pollen studies (Martin 1978). The border region of New South Wales and Queensland is an area where perhaps important information on the origins of some tropical bryophytes may also be found.

The southern alpine and New South Wales–Queensland border regions contain both endemics and species whose wider distribution patterns are interesting. With taxonomic assessment of species with limited distributions and intensive collecting in regions of particular interest, it may be feasible within the foreseeable future to begin mapping distribution in detail for some species, as well as determining species diversity within defined geographical areas — as large as regions used in this study or in smaller more discrete localities as in the Australian Capital Territory.

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THE MOSSES OF LORD HOWE ISLAND

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ABSTRACT

Ramsay, Helen P. (School of Botany, University of New South Wales, Kensington, N.S.W. 2033) 1984. The Mosses of Lord Howe Island. Telopea 2(5): 549-558. — The mosses of Lord Howe Island are diverse with a close relationship to Australian and New Zealand species. Of the 105 species from 36 families, 21 species (20%) are endemic. A checklist of species based on literature and collections in Australian herbaria is included together with a summary of their distribution patterns on the Island. This is a preliminary updating of previous records, not a taxonomic revision. The geographical relationships of the species are discussed.

INTRODUCTION

Here on this rich plateau may be found fern after fern and moss after moss that occur nowhere else in the world.

(Brotherus & Watts 1915)

This description typifies the experience Rev. W.W. Watts had on his visit to Lord Howe Island, in particular Mt. Gower, in 1911 when he collected widely — ferns, mosses, hepatics. His visit inspired a poem, part of which is quoted in Ramsay (1980), and led to a series of papers with lists and descriptions of new species of ferns, mosses and hepatics from the Island (Watts 1913, 1914, 1916; Brotherus & Watts 1915; Stephani & Watts 1914). Botanically, Lord Howe Island is of great interest because of the richness of the flora, which includes temperate and subtropical taxa with a high degree of endemism.

Island floras have always attracted interest for studies on species, their distribution and evolution in geographically isolated regions. Balgooy (1960, 1969, 1971), Whittier (1974) and Miller (1974) have been investigating island floras in the Pacific, particularly Polynesia, and their relationships. Miller (1974) states:

> 'Just recently I had occasion to review the bryoflora of Lord Howe Island, although some subtropical species are present, the flora is remarkably austral and antipodal. It is certainly not part of the Polynesian subkingdom as it is usually considered — i.e. an attenuation of the Malaysian-Papuan floras and it is not typical of the flora of nearby Australia. The bryological flora confirms Takhtajan's view of an attenuation of the New Zealand flora even though the floristic overlap is not absolute.'

Takhtajan (1969) placed Lord Howe Island and Norfolk Island with New Zealand in his phytogeographical divisions of the Pacific Island groups, whilst Balgooy (1969) also concluded that 'the best solution is to maintain Lord Howe Island as a district within the New Zealand sub-region'. In this sub-region there is a high degree of correspondence between floristic limits and submarine geography and geology that are related to the geomorphic plates and great trenches of the ocean floor (Miller 1974).

As early as 1853, a short account of vegetation on Lord Howe Island was given by J. MacGillivray, an assistant surgeon on HMS "Herald", who surveyed the island. Literature related to Lord Howe Island is summarised in Pickard (1973) and Recker & Ponder (1981).

Although politically a part of New South Wales, the island has never had any land connection, being located on the eastern edge of the Australian continental shelf. It lies 790 km north-east of Sydney, some 550 km from the Australian coast (c.31°30′S, 159°05′E) in the Pacific Ocean. Lord Howe Island is considered to have arisen from an extensive undersea ridge and represents the eroded remnant of a large shield volcano (McDougall et al. 1981; Phipps 1981) of Tertiary age.

The climate is subtropical with no great range in temperature, being warmed by the South Equatorial Current. The average annual rainfall, mostly in winter, is stated as 1676 mm, but believed to be far higher on the mountain summits. Soils are of two kinds:

(1) derived from Pleistocene carbonate sandstones that contain little volcanic material, on the northern part of the island; loose, sandy and dry with low moisture content (calcarenite).

(2) volcanic in origin, forming basalt soils on the eroded remnant of a volcanic peak of two ages – (a) northern part of Mt Lidgbird, older; (b) the soils making up most of Mt Lidgbird and Mt Gower are younger.

Two mountains, Mt Gower, 866 m, and Mt Lidgbird, 765 m, force warm moist air suddenly into colder altitudes where moisture is deposited as mist or rain (Edgecomb & Bennett 1978). As a consequence, the summit of Mt Gower is covered by a gnarled mossy rainforest of great botanical, indeed biological interest, 'one of Nature's Botanic Gardens' (Brotherus & Watts 1915). The moss forest at the summit of Mt Gower and Mt Lidgbird is composed of small trees, shrubs, palms and tree-ferns with an undergrowth of low ferns and sedges, the floor being mostly carpeted by mosses. Epiphytes cover almost every available space on larger plants (Oliver 1917).

The flora is heterogeneous, being related to Australian, New Zealand and Polynesian (Pacific Island) biota with the proportion of endemic forms in the Australian element well below that of the other two groups (Oliver 1917). However, in the non-endemic genera, Australian forms, 158 species, predominate, another 147 have Polynesian affinities and a further 109 occur in New Zealand. Thirty-three per cent of vascular plant species are endemic with related species evenly distributed between Polynesia, Australia and New Zealand (Oliver 1917). The relationship of the ferns is predominantly with the Australian region (Brownlie 1965). Non-endemic vascular plant species have mainly Australian affinities but the presence of a Malesian element distinguishes the Island flora from that of New Zealand and Australia (A.N. Rodd, pers. comm.). In spite of the close relationship to the Australian flora, most genera of angiosperms characteristic of Australia are absent from Lord Howe Island (Oliver 1917).

In a recent vegetation survey, 30 vegetation and six habitat classes, each dependent on soil, altitude and degree of exposure, have been mapped (Pickard 1973, 1974, 1983) for 178 native species of angiosperms, of which 55 species and 5 genera are endemic (Rodd 1974).

Knowledge of the bryophyte flora is still largely dependent on publications by Whitelegge (1892) and Brotherus & Watts (1915) on mosses, and Stephani & Watts (1914) on hepatics, where species collected by Watts during a seven-week stay on the island in 1911 are listed. No comprehensive collecting has been done since then although botanical visitors to the island have sometimes brought specimens home with them to Australian or overseas herbaria at various times.

This is a preliminary analysis of the mosses consisting of an updating of the literature records, the distribution being recorded from specimens located in the National Herbarium of New South Wales. Names applied to specimens have been accepted until a taxonomic revision by Vitt & Ramsay can be completed.

DISTRIBUTION

Distribution on the island

The distribution of moss species has been recorded in three geographical zones (Fig. 1):

1. *Northern zone* — In this region the highest points are Malabar (218 m) and Mt Eliza (158 m) representing part of the rim of an ancient volcano.

2. *Central zone* — This is the populated and agricultural area, being lowest in altitude on the island. It is bounded by a coral reef to the west while Intermediate Hill (250 m) on its south-eastern boundary, is surrounded by stratified limestone beds of marine origin and links with the foothills of Mt Lidgbird. This region is species rich because of its accessibility and the fact that it has been closely collected.

3. *Mountain zone* — The two peaks, (a) Mt Gower, 866 m (southernmost), and (b) Mt Lidgbird, 765 m, form this region. They represent a later period of volcanic activity and have been heavily eroded.

0. *Unspecified* — Where no actual locality on the island is given.

The choice of zones has been made on the basis of topography and soils rather than other criteria, as collecting data have not been detailed enough to determine whether the vegetation zones of Pickard (1974, 1983) would be appropriate. The divisions chosen correspond closely to those mentioned by Oliver (1917, p.95).

Distribution of species across the island shows an interesting separation into those with widespread, and those with limited distribution (Table 1). Mt Gower and Mt Lidgbird species have been recorded separately where this is known, or simply from Zone 3 if not. Differences in numbers of species may be due primarily to Mt Lidgbird's inaccessibility to collectors, although its altitude is 100 m less than that of Mt Gower.

Table 1. Distribution of Species on Lord Howe Id.

Zone	1	2	3a	3b	3	0
No. species	26	56	37	6	13	28 (unspecified)
Nos. in this zone only	7	20			15	
				(3 in 3b only)		

Relationships of Lord Howe Island mosses

Whitelegge (1892) and Brotherus & Watts (1915) between them listed 120 species of mosses of which 24 were reported as endemic. Brotherus & Watts (1915) described 20 new species jointly and Brotherus two species. Some of these names have been reduced to synonymy and present studies that include data from collections not previously documented give the number of species as 105 in 58 genera and 36 families.

Relationships of these are interesting with 21 species (or 20%) being endemic (see Ramsay 1984a). This is a low proportion when compared with some of the islands in the Pacific region, e.g. 60% New Caledonia and Hawaii, 35% Society Islands, 30% New Zealand (Whittier 1974, Miller 1974). Most mosses have relationships with Australian species (60%) (see Ramsay 1984a). These include both temperate and subtropical forms. The Australian species that are found on Lord Howe Island are primarily those that occur also in New Zealand (42 species or 37.5%). Only 10 taxa are confined to Australia, New Zealand and Lord Howe Island, the other 32 are either cosmopolitan (12) or extend across the Southern Hemisphere, mainly the Pacific and South America. About 10 taxa are distributed

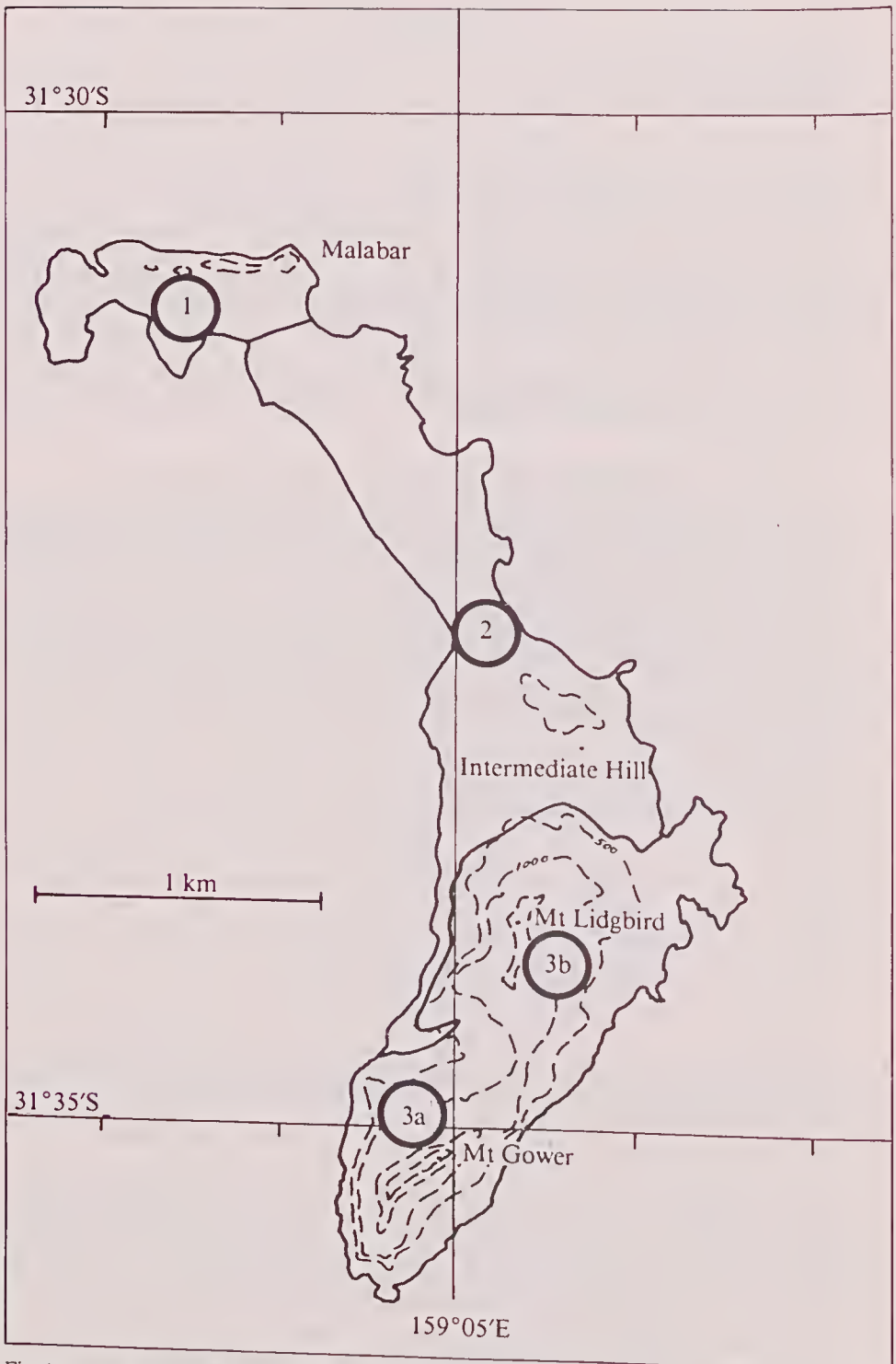

Fig. 1. Lord Howe Island showing division into areas for this study.

only in Australia (2 New South Wales only, 2 or 3 Queensland only, 3 both New South Wales and Queensland) apart from Lord Howe Island.

The cosmopolitan species found on Lord Howe Island are: *Ceratodon purpureus, Grimmia laevigata, G. pulvinata, Fissidens fontanus, Barbula calycina, Tortula pagorum, Weissia controversa, Funaria hygrometrica, Bryum argenteum, B. billardieri, B. capillare* and *Hypnum cupressiforme.* Notable absences are *Sphagnum* spp. and *Andreaea* spp. as well as all the Polytrichaceae except *Atrichum androgynum.*

The distribution of mosses on Lord Howe Island supports the view that the relationships of vegetation are with Australia and New Zealand rather than other Pacific Island groups but, unlike the vascular plant species, the percentage of endemics is low as is the percentage with relationships to Polynesian species. There is no doubt that the flora will contain other species that have not yet been collected. Specimens available were obtained in only a few months of the year, and do not range over all seasons. Areas formerly inaccessible when previous collections were made may be reached in the future, possibly with use of helicopters. Collections in overseas herbaria may also be able to add new species and distribution data to our present limited knowledge. Work is continuing and Vitt & Ramsay are preparing a complete revision of the moss flora to appear later.

ACKNOWLEDGEMENTS

The National Herbarium of New South Wales has been most co-operative in allowing me access to collections. J. Pickard and A. Rodd have helped in discussion of angiosperm vegetation and by providing a map. I am greatly indebted to these people and to those who have collected and deposited specimens of mosses from the island at various times in Australian herbaria. The work was made possible through funding from the Australian Biological Resources Study as part of the wider project on a Census of New South Wales mosses.

LIST OF MOSSES FROM LORD HOWE ISLAND

(Genera and species are listed alphabetically within families, which are numbered according to Crosby & Magill 1981. The only synonyms included are those from Brotherus & Watts 1915 original listing).

NAME	DISTRIBUTION†					
	0	1	2	3a	3b	3
3. FISSIDENTACEAE						
*Fissidens amblyothallioides Broth. & Watts	○	○	●	○	○	○
F. arboreus Broth.	○	●	●	○	○	○
*F. arcuatulus Broth. & Watts	○	○	●	○	○	○
F. crassipes Wils. ex B.S.G. [*F. dietrichiae* C. Muell.]	○	○	●	○	○	○
*F. howeanus Broth. ex Whitel.	●	○	○	○	○	○
*F. longiligulatus Broth. & Watts	●	○	○	●	○	○
*F. subtenellus Broth. & Watts	○	○	●	○	○	○
*F. tenelliformis Broth. & Watts	○	●	○	○	○	○
F. tenellus Hook. f. & Wils.	○	○	●	○	○	○
F. wattsii Broth.	○	●	●	○	○	○
5. DITRICHACEAE						
Ceratodon purpureus (Hedw.) Brid.	○	○	●	○	○	○

* Endemic species.

† Zones of occurrence: 0 — zone unspecified; 1 — northern zone; 2 — central zone; 3 — mountain zone (mountain not specified); 3a — Mt Gower; 3b — Mt Lidgbird.

● present ○ absent

NAME	DISTRIBUTION					
8. DICRANACEAE						
Campylopus clavatus (R. Br.) Wils.	○	○	○	●	○	○
C. introflexus (Hedw.) Brid.	○	●	●	○	○	○
[*C. pudicus* (C. Muell.) Jaeg.]						
C. pallidus Hook. f. & Wils.	○	○	○	○	●	○
[*C. woollsii* (C. Muell.) Par.]						
Dicnemoloma pallidum (Hook.) Wijk & Marg.	●	○	○	●	○	○
[*Leucoloma sieberianum* (Hornsch.) Jaeg.]						
Dicranoloma billardieri (Brid.) Par.	○	○	○	●	○	○
D. dicarpum (Nees) Par.	○	○	●	●	●	○
D. menziesii (Tayl.) Par.	●	○	○	●	○	○
[*D. bartramioides* (Broth.) Par.]						
Holomitrium perichaetiale (Hook.) Brid.	○	○	○	●	●	○
H. perichaetiale (Hook.) Brid. var. **robustum** Broth. & Watts	●	○	○	○	○	○
Trematodon sp.	○	○	●	○	○	○
	0	**1**	**2**	**3a**	**3b**	**3**
11. LEUCOBRYACEAE						
Leucobryum candidum (P. Beauv.) Wils.	●	○	○	○	●	○
L. candidum var. **pentastichum** (Dozy & Molk.) Dix.	○	○	●	○	○	○
[*L. speirostichum* C. Muell. *nom. nud.*]						
12. CALYMPERACEAE						
***Syrrhopodon platycerı** Mitt.	○	○	●	○	○	○
14. POTTIACEAE						
Barbula calycina Schwaegr.	○	●	○	○	○	○
[*Tortella calycina* (Schwaegr.) Dix.]						
Tortella cirrhata Broth.	○	●	●	○	○	○
[*T. subflavovirens* Broth. & Watts]						
Tortula pagorum (Milde) De Not.	○	●	○	○	○	○
[*T. baileyi* auct. non Broth.]						
?Trichostomum sp.	○	●	●	○	○	○
Weissia controversa Hedw.	○	●	●	●	○	○
[*W. flavipes* Hook. f. & Wils.]						
15. GRIMMIACEAE						
Grimmia laevigata (Brid.) Brid.	○	●	○	○	○	○
[*G. campestris* Burchell ex Hook.]						
G. pulvinata (Hedw.) Sm. var. **africana** (Hedw.) Hook. f. & Wils.	○	●	○	○	○	○
[*G. cygnicolla* Tayl., *G. pulvinata* var. *obtusa* (Brid.) Hueb.]						
Racomitrium aciculum Dix.	●	○	○	○	○	○
19. FUNARIACEAE						
Funaria hygrometrica Hedw.	○	●	○	○	○	○
[*F. hygrometrica* Hedw. var. *sphaerocarpa* C. Muell.]						
	0	**1**	**2**	**3a**	**3b**	**3**
24. BRYACEAE						
Bryum argenteum Hedw.	○	●	●	○	○	○
B. argenteum Hedw. var. **lanatum** (P. Beauv.) Hampe	○	●	○	○	○	○
B. argenteum Hedw. var. **niveum** Wils.	○	●	●	○	○	○
B. billardieri Schwaegr. var. **billardieri**	○	●	●	○	○	●
[*B. leptothecium* Tayl.]						
B. campylothecium Tayl.	○	●	○	●	●	○
[*B. howeanum* Broth. & Watts]						
B. capillare Hedw.	○	●	●	○	○	○
[*B. leptothecioides* Broth. & Watts, *B. whiteleggei* Broth. *nom. nud.*]						
B. coronatum Schwaegr.	○	○	●	●	○	○
[*B. subatropurpureum* C. Muell.]						
B. dichotomum Hedw.	○	○	●	○	○	●
[*B. aequicollum* Broth. & Watts, *B. philonotideum* Broth. & Watts]						
B. erythrocarpoides C. Muell. & Hampe	○	●	●	○	○	○
[*B. diversinerve* Broth. & Watts]						

NAME	DISTRIBUTION					
B. leucocanthum (Hampe) Mitt. [*Rhodobryum leucocanthum* Hampe]	○	●	●	○	○	●
B. limbifolium Broth. & Watts	○	○	●	○	○	○
B. sauteri B.S.G.	○	●	○	○	○	○
25. LEPTOSTOMATACEAE						
Leptostomum macrocarpum (Hedw.) Pyl.	○	○	○	○	○	●
32. RHIZOGONIACEAE						
Mesochaete undulata Lindb.	○	○	●	●	○	○
Pyrrhobryum parramattense (C. Muell.) Manuel [*Rhizogonium parramattense* (C. Muell.) Reichdt.]	●	○	○	●	○	○
33. HYPNODENDRACEAE						
Braithwaitea sulcata (Hook.) Jaeg.	●	○	○	○	○	○
37. BARTRAMIACEAE						
***Philonotis jardinii** (Besch.) Par.	○	○	○	○	○	●
P. tenuis (Tayl.) Reichdt. [*P. pseudomollis* (C. Muell.) Jaeg.]	○	○	●	●	○	○
38. SPIRIDENTACEAE						
Spiridens vieillardii Schimp. [*S. muelleri* Hampe]	●	○	○	●	●	○
41. PTYCHOMITRIACEAE	0	1	2	3a	3b	3
Ptychomitrium australe (Hampe) Jaeg.	●	○	○	○	○	○
P. muelleri (Mitt.) Jaeg. [*Glyphomitrium commutatum* (C. Muell.) Broth., *G. howeanum* (Hampe) Broth.]	●	●	○	●	○	○
42. ORTHOTRICHACEAE						
Macromitrium brachypodium C. Muell. [*M. brevisetaceum* Hampe]	○	●	●	●	○	○
M. leratii Broth.	○	○	○	○	●	○
M. peraristatum Broth.	●	○	○	●	○	○
M. brevicaule (Besch.) Broth. [*M. subbrevicaule* Broth. & Watts, *M. wattsii* Broth.]	○	●	○	○	○	○
44. RACOPILACEAE						
Racopilum cuspidigerum (Schwaegr.) Aongst. var. **cuspidigerum** [*R. pacificum* Besch.]	○	○	●	○	○	○
R. cuspidigerum (Schwaegr.) Aongst. var. **convolutaceum** (C. Muell.) Zant. & Dijkstra [*R. convolutaceum* (C. Muell.) Reichdt.]	○	○	●	○	○	○
51. PTYCHOMNIACEAE						
Ptychomnion aciculare (Brid.) Mitt.	●	○	○	●	○	○
57. PTEROBRYACEAE						
***Euptychium mucronatum** Hampe	●	○	○	○	○	●
E. robustum Hampe	●	○	○	○	○	●
***E. setigerum** (Sull.) Broth. [*E. cuspidatum* (Mitt.) Mitt.]	●	○	○	○	○	○
***Pterobryella praenitens** (Hampe) C. Muell. [*Hypnodendron praenitens* (Hampe) Mitt.]	●	○	○	●	●	○
***Trachyloma wattsii** Broth.	●	○	○	●	○	○
58. METEORIACEAE						
Barbella enervis (Thwait. & Mitt.) Fleisch. [*Meteorium trichophoroides* (C. Muell.) Mitt.]	●	○	○	●	○	○
Weymouthia mollis (Hedw.) Broth.	○	○	○	●	○	○
59. PHYLLOGONIACEAE						
Catagonium politum (Hook. f. & Wils.) Dus. ex Broth.	○	○	○	●	○	○
Orthorrhynchium elegans (Hook. f. & Wils.) Reichdt.	○	○	○	●	○	○

NAME	DISTRIBUTION					
	0	1	2	3a	3h	3
60. NECKERACEAE						
Thamnobryum pumilum (Hook. f. & Wils.) Nicuwl. [*Thamnium gracillimum* (Hampe) Broth. & Watts]	○	○	●	●	○	○
61. LEMBOPHYLLACEAE						
Camptochaete arbuscula (Sm.) Reichdt. var. **deflexa** (Wils.) Dix. [*C. deflexa* (Wils.) Jaeg.]	○	○	○	●	○	○
C. vaga (C.Muell.) Broth.	●	○	○	●	○	○
62. ECHINODIACEAE						
Echinodium hispidum (Hook. f. & Wils.) Reichdt.	○	○	●	●	○	○
***E. parvulum** Broth. & Watts	○	○	●	○	○	○
65. HOOKERIACEAE						
Achrophyllum dentatum (Hook. f. & Wils.) Vitt & Crosby [*Pterygophyllum hepaticaefolium* (Hampe & C. Muell.) Jaeg., *Pterygophyllum nigelhum* (Hook. f. & Wils.) Mitt.]	○	○	●	●	○	○
***Distichophyllum longicuspis** Broth. [*D. leucoloma* Broth. *nom. nud.*]	●	○	●	○	●	○
68. HYPOPTERYGIACEAE						
Cyathophorum bulbosum (Hedw.) C. Muell. [*C. pennatum* (Labill.) Brid.]	○	○	○	●	○	○
Hypopterygium muelleri Hampe [*H. scottiae* C.Muell.]	○	○	●	●	●	○
H. rotulatum (Hedw.) Brid.	○	○	●	●	●	○
72. THUIDIACEAE						
Thuidium cymbifolium (Dozy & Molk.) Dozy & Molk.	●	○	○	●	○	○
T. furfurosum (Hook. f. & Wils.) Reichdt.	○	○	●	○	○	○
T. protensulum C. Muell.	●	○	○	○	○	○
***T. trachypodioides** Broth. & Watts	○	○	●	●	○	○
74. BRACHYTHECIACEAE						
Eurhynchium muriculatum (Hook. f. & Wils.) Jaeg. [*Rhynchostegiella muriculata* (Hook. f. & Wils.) Broth.]	○	○	○	●	●	○
***Oxyrrhynchium howeanum** Broth. & Watts	○	○	○	●	○	○
***Rhynchostegiella campylioides** Broth. & Watts	●	○	●	○	○	●
Rhynchostegium tenuifolium (Hedw.) Reichdt.	○	○	●	○	○	○
***R. tenuifolium** (Hedw.) Reichdt. var. **howeanum** Broth & Watts	○	○	●	○	○	○
75. ENTODONTACEAE	0	1	2	3a	3h	3
Entodon pancherianus (Besch.) Jaeg.	○	●	○	●	○	○
77. SEMATOPHYLLACEAE						
***Pungentella subfalcatulum** (Broth. & Watts.) C. Muell. [*Rhaphidostegium subfalcatulum* Broth. & Watts]	○	○	●	●	●	○
Sematophyllum aciculum (Dix.) Dix. [*Rhapidostegium aciculum* Broth. ex Dix.]	●	○	○	○	○	○
S. amoenum (Hedw.) Mitt. [*Rhaphidostegium callidioides* (C. Muell.) Jaeg., *Rhaphidorrhynchium callidioides* (C. Muell.) Broth.]	●	○	○	○	○	○
S. contiguum (Mitt.) Mitt. [*Rhaphidostegium contiguum* (Mitt.) Par.]	○	●	●	●	●	○
***Trichosteleum muscicolum** Broth.	●	○	●	●	○	○
Wijkia extenuata (Brid.) Crum [*Acanthocladium extenuatum* (Brid.) Mitt.]	○	○	○	●	○	○
W. crossii (Broth.) Crum	●	○	○	○	○	○
78. HYPNACEAE						
Ctenidium pubescens (Hook. f. & Wils.) Broth.	○	○	●	○	○	●
***Ectropothecium howeanum** Broth. & Watts	○	○	●	○	○	○

NAME	DISTRIBUTION					
*E. leucochloron (Hampe) Broth.	○	●	●	○	○	○
E. umbillicatum (C. Muell.) Par.	●	○	○	○	○	○
Hypnum chrysogaster C. Muell. [*Stereodon chrysogaster* (C. Muell.) Mitt.]	○	○	○	●	●	○
H. cupressiforme Hedw.	○	○	○	●	●	○
Isopterygium albescens (Hook.) Jaeg. [*I. candidum* (C. Muell.) Jaeg., *I. molliculum* (Sull.) Mitt.]	○	○	●	○	○	○
I. howeanum Broth. & Watts	○	○	●	○	○	○
Vesicularia montagnei (Bel.) Broth.	○	○	●	○	○	○
83. POLYTRICHACEAE						
Atrichum androgynum (C. Muell.) Jaeg. [*Catharinea muelleri* C. Muell. & Hampe]	●	○	○	●	○	○
84. DAWSONIACEAE						
Dawsonia polytrichoides R. Br.‡	●	○	○	○	○	○

‡ Although doubt has been expressed on the reliability of the original record (Watts 1915) specimens collected in 1920 have been found which include specimens of *Dawsonia polytrichoides* amongst others but locality undefined.

NOMINA NUDA

The following species for which specimens have been located await attention to establish their relationships (*endemics)

* *Leucobryum pseudocandidum* Broth.
Amblystegium orbiculare Jaeg.
* *Plagiothecium howeanum* Jaeg.

RECORDS NOT SUBSTANTIATED

Records appearing in literature for the following have not been substantiated by specimens in Australian herbaria.

Rhodobryum commersonii (Schwaegr.) Par.
Camptochaete gracilis (Hook. f. & Wils.) Par.
Entodon pallidus Mitt.
Neckera trichophoroides C. Muell.
Racomitrium leptostomoides Förster

SYNONYMS

For the correct application of synonyms, see Ramsay, H.P. (1984), Census of New South Wales mosses, *Telopea* 2 (5): 455-533.

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† For a full reference list see Ramsay, H.P. (1984), Census of New South Wales mosses, *Telopea* 2 (5): 455-533.

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MOSSES AND THEIR DISTRIBUTION IN THE AUSTRALIAN CAPITAL TERRITORY

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ABSTRACT

Ramsay, Helen P.[1] & Streimann, H.[2] ([1]School of Botany, University of New South Wales, Kensington, N.S.W. Australia 2033; [2]Herbarium, National Botanic Gardens, Canberra A.C.T. Australia 2601). Telopea 2(5): 559-574. — The Australian Capital Territory is geographically located on the Southern Tablelands of New South Wales. The area is physiographically and climatically diverse with alluvial terrain to high ridges reaching 1900 m. More than 180 species from 39 families and their distribution within the A.C.T. are recorded. Data on distribution in other regions of N.S.W. and in other Australian states are also given. Affinities are mainly with temperate mosses of southern Australia.

INTRODUCTION

The Australian Capital Territory (A.C.T.), although a discrete political territory, is geographically located on the Southern Tablelands of New South Wales. In area it covers 2357 sq. km with more than half being occupied by rugged mountainous catchment areas (Learmonth 1973). Canberra, the capital city of Australia, lies on a plain 600 m above sea level and approximately 100 km from the coast on the western side of the Great Dividing Range in the A.C.T.

The physiography of the A.C.T. can be divided into: (i) high ridges and steep hillslopes; (ii) rolling terrain; (iii) gently undulating terrain; (iv) alluvial terrain. The Murrumbidgee River and its tributaries, the Molonglo and Cotter rivers, pass through the Territory. The Murrumbidgee and Molonglo drain from the Great Dividing Range, while the Cotter originates in the ranges west of Canberra. On the western boundary are the Brindabella-Bimberi Ranges that connect with the Snowy massif. The Scabby-Boboyan Ranges form the southern boundary. A number of peaks within these ranges reach 1800 m with Bimberi Peak 1903 m in the south the highest. They form a dissected plateau, part of the Kosciusko peneplain, cut across by folded and steeply dipping Ordovician and Silurian slates, schists, slaty shales and grit, Silurian volcanics, with some Palaeozoic porphyry, granite, and Devonian igneous rocks. Alluvial flats form the Canberra basin, a rain-shadow area often having less than 600 mm rainfall (Learmonth 1973).

Great variations in climate occur between the Canberra plain and the higher peaks on the western ranges. There are numerous rain-shadows in the deeper valleys, but the main rain-shadow is the Canberra plain itself. It is dry during the summer, most of the rainfall being derived from a few downpours, but high evaporation rates, about 1600 mm annually, reduce its effectiveness. On the ranges the precipitation may reach 1500 mm per year, and is more uniform. In winter, inversions cause fogs and some of the grasslands in the higher valleys may have evolved from the settling of cold air. In addition, Canberra gets about 100 days of frost per annum, with a large range of diurnal temperatures in both winter and summer. Less is known of the climate at higher altitudes but data in Table 1 (see page 563) illustrate some of the variation at different altitudes.

Snow occurs on the ranges above 1220 m and on the higher parts (above 1500 m), where it may lie for 3 to 4 months. Soils tend to correlate to topography, geology and the climatic influences over long periods.

DISTRIBUTION WITHIN THE A.C.T.

Vegetation in the A.C.T. has affinities with elements from Mt Kosciusko, the Victorian Alps and Tasmania. The zonations of the A.C.T. vascular flora are mostly altitudinal. Little has yet been done on the altitudinal distribution or the ecology of the non-vascular flora exeept on Mt Ainslie and Blaek Mountain. Mueh of the vegetation has been greatly modified by man since European settlement (Pryor 1954).

Natural features or major roads have been used to define five topographieally separate divisions of the A.C.T. for this project (see Fig. 1). The Brindabella Ranges division encompasses almost all the topographical environments found in the A.C.T. The following are short deseriptions of each division. (Jervis Bay is excluded as it is geographically in a separate part of New South Wales and unrelated floristically to the rest of the A.C.T.)

Division 1. *BOOTH RANGE* (east side of Gudgenby Road)
Three vegetation types predominate here. At higher altitudes (>700 m) *Eucalyptus delegatensis – E. dalrympleana* form wet sclerophyll forest. In the broad upper valley systems *E. pauciflora – E. stellulata* savannah woodlands are present, while in the northern area between the Booth and Clear Ranges *E. melliodora – E. blakelyi* woodlands oeeur (Burbidge & Gray 1970). There has been very little disturbanee to the area except for grazing in the north. Most of the area is in the Namadgi National Park.

The altitude ranges from 640 m to 1600 m (Mt Clear) with foliated granodiorite as the predominant rock.

Division 2. *SOUTHERN RANGES* (south of Orroral and west of Gudgenby road)
The vegetation eomprises mostly *Eucalyptus delegatensis – E. dalrympleana* wet sclerophyll forest with seattered poekets of *E. pauciflora – E. stellulata* savannah woodlands along the larger stream valleys. The higher ranges have alpine woodlands of stunted *E. pauciflora* and grasses (Burbidge & Gray 1970). Small areas of *Sphagnum* swamp are seattered throughout this region. Least disturbanee has taken plaee in this division. The Namadgi National Park includes a large area here as well as Division 1.

The main rocks are foliated granodiorites that form large speetacular outcrops. Along the Cotter Valley, from near the eonfluenee of the Orroral and Gudgenby rivers to the southern border, sandstone and greywaeke are found. The altitude ranges from 840 m to 1903 m (Bimberi Peak, the highest peak in the A.C.T.).

Division 3. *BRINDABELLA RANGES* (north of the Orroral–Cotter Hut roads)
The vegetation in this division varies greatly from tree-fern-shaded, humid gullies at the Tidbinbilla Nature Reserve to alpine woodlands of *Eucalyptus pauciflora* on the higher parts of the ranges adjaeent to the N.S.W. border. The undulating lowlands along the Murrumbidgee and Paddys rivers earries *E. melliodora – E. blakelyi* savannah woodland with *Casuarina cunninghamii* along the banks. However, mueh of this is now grazing land or *Pinus radiata* plantations. *Eucalyptus macrorhyncha – E. rossii* dry selerophyll forest oeeurs on northerly and westerly faees of the mountains. Also a seetion of *E. fastigata – E. viminalis* wet selerophyll forest oecurs along the Cotter Valley with a seattered dense understorey of Compositae, Myrtaceae and Rhamnaeeae (Burbidge & Gray 1970). Extensive, scattered *Sphagnum* swamps oceur at high altitudes on tributaries of the Cotter River. Within the area, moist gullies with tree-ferns and numerous "eoastal" moss species, e.g. *Camptochaete* and *Hypnodendron*, are present.

Most of this area, ineluding Mt Gingera, is foliated granodiorite, although a section of greywaeke, slate and sandstone oceurs at Mts Aggie, Franklin and Ginini. Mt Coree is eovered by voleanie roeks and part of the Tidbinbilla Range is

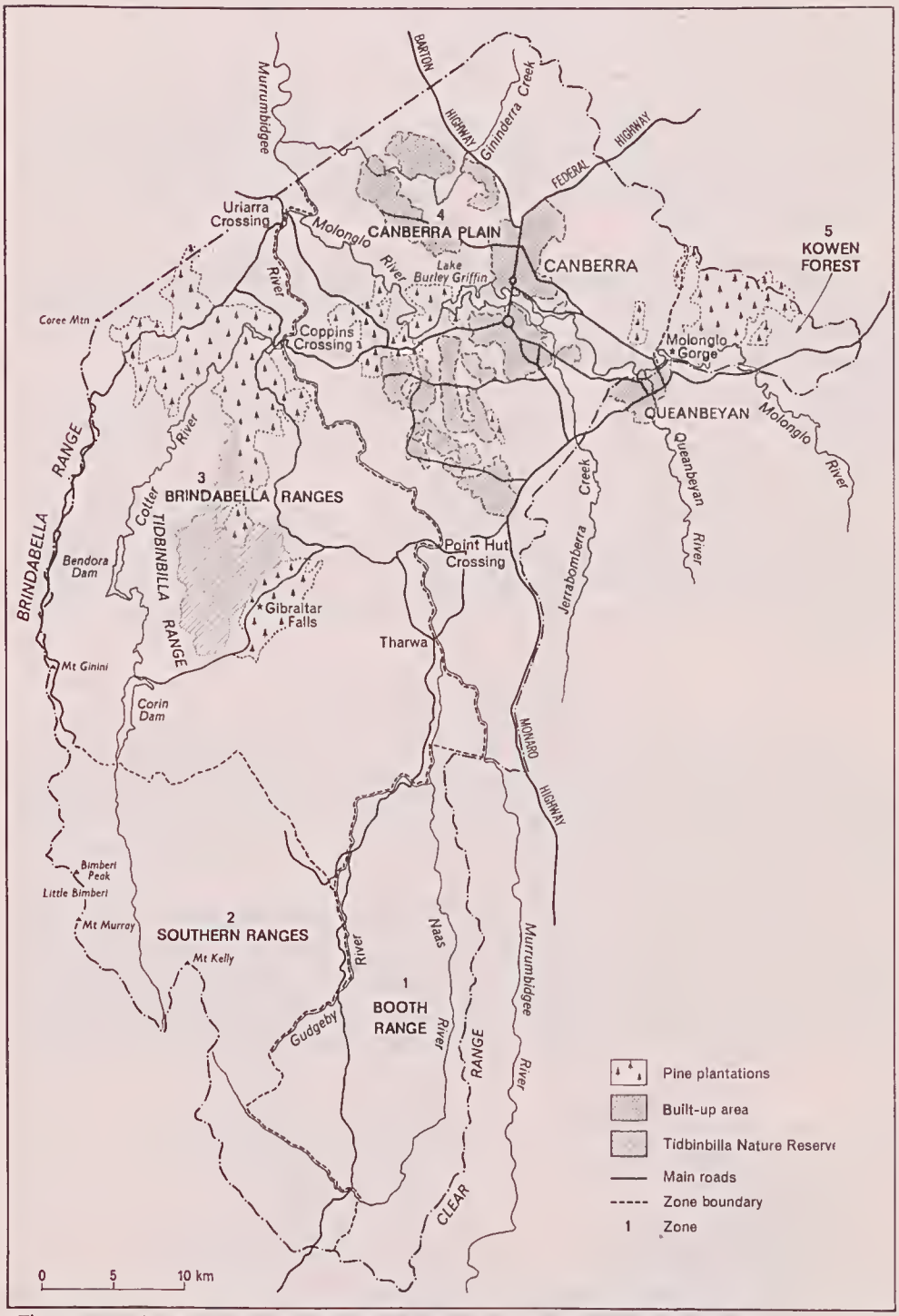

Fig. 1. Australian Capital Territory showing division into areas defined for this study.

quartzite. Volcanic rocks cover extensive areas in the north. The altitude varies between 410 and 1856 m (Mt Gingera).

Division 4. *CANBERRA PLAIN* (bounded on south-east by Sutton Road and west by the Murrumbidgee River)
This plain has several outeropping mountains — Black Mountain, Mts Majura and Ainslie, and Red Hill. The area is predominantly a mixture of acid volcanic rocks and porphyry. The altitude varies between 410 and 890 m (Mt Majura). The plain is drained by the Molonglo and Murrumbidgee rivers while most of the smaller streams are seasonal.

Much disturbance has been caused by grazing and urbanization. As a result, a large proportion of the original *Themeda–Poa* grasslands of the river flats and the *Eucalyptus melliodora – E. blakelyi* savannah woodlands now occur only in small pockets. There are small sections of *E. rossii – E. macrorhyncha,* with the most extensive being around Black Mountain.

Division 5. *KOWEN FOREST* (east of Sutton Road)
Eucalyptus rossii – E. macrorhyncha dry sclerophyll forest predominates and savannah woodlands occur along the northern boundary of the A.C.T. Extensive *Pinus radiata* plantations occur in this division.

Folded sedimentary rocks (greywacke, slate and sandstone) form the underlying strata that generally developed shallow, gravelly soils. Most of the area is hilly or rolling country with a steep section along a fault line near the Sutton Road. Further steep sections are encountered along the Molonglo River. This is now a nature reserve and a popular recreation area. The altitude varies between 610 and 920 m.

COMPILATION OF DATA

The following data, presented in Table 2, have been compiled from field work and herbarium specimens held in the Herbarium Australiense (CANB), and the Herbarium, National Botanic Gardens (CBG) in Canberra; the National Herbarium of New South Wales (NSW), the Herbarium, University of New South Wales (UNSW), the Ray Herbarium, University of Sydney (SYD) and the private collection of Professor D.G. Catcheside.

Names follow those in use according to Index Muscorum plus supplements (Wijk et al. 1959-1969; Crosby 1977, 1979; Crosby & Bauer 1981) together with information from Scott & Stone (1976), Catcheside (1980) and other taxonomic publications. For synonyms, nomina nuda and further information see Census of New South Wales mosses (Ramsay 1984). Families are arranged according to Crosby & Magill (1981), with genera and species listed alphabetically in families.

KEY TO SYMBOLS USED FOR DISTRIBUTION

LHI	Lord Howe Island	FWP	Far Western Plains
C	Coast	N	North
T	Tablelands	C	Central
WS	Western Slopes	S	South
WP	Western Plains	NSW	New South Wales

● > 3 collections in the subdivision
o no sighted or cited specimen from the subdivision
? specimen or cited locality inadequate for reliable record
* number of specimens ⩽3
Q — Queensland, V — Victoria, T — Tasmania, Y — Northern Territory, S — South Australia, W — Western Australia

TABLE 1. CLIMATIC DATA FOR CANBERRA AND BULLS HEAD.

Location	Alt (m)	Temperature (°C)						Rain	Evap^n
		Jan.		July		Extremes		Av. annual (mm)	
		Av. max.	Av. min.	Av. max.	Av. min.	Max.	Min.		
Canberra	600	27.5	13.0	11.1	-0.4	42.2	-10.0	633	1600
Bulls Head*	1320	21.3	9.7	5.2	-2.0	35.1	-12.2	1009	—

*Junction Brindabella and Bendora Dam roads.

TABLE 2. MOSSES AND THEIR DISTRIBUTION IN THE A.C.T.
(families arranged according to Crosby & Magill 1981)

Name	Distribution						
	A. C. T.					N.S.W.	OTHER STATES
	1 Booth Ra.	*2 S. Ranges*	*3 Brindabella*	*4 Canberra*	*5 Kowen*		
1. SPHAGNACEAE							
Sphagnum cristatum Hampe [*S. magellanicum Brid.*]	★	●	★	o	o	NC CC T	QVT
S. falcatulum Besch.	o	★	★	o	o	ST only	QVT
S. molliculum Mitt. [*S. cymbifolioides* C. Muell., *S. subsecundum* auct. non Nees]	o	★	o	o	o	C CT ST	VTSW
2. ANDREAEACEAE							
Andreaea australis Mitt.	o	●	★	o	o	ST only	VT
A. mutabilis Hook. f. & Wils. [*A. rupestris* auct. non Hedw.]	★	●	★	o	o	CT ST	VT
A. nitida Hook. f. & Wils.	o	o	★	o	o	ST only	VT

o — not collected ★ ⩽ 3 collections ● > 3 collections

Name	Distribution						
	A. C. T.					N.S.W.	OTHER STATES
	1 *Booth Ra.*	*2* *S. Ranges*	*3* *Brindabella*	*4* *Canberra*	*5* *Kowen*		
3. FISSIDENTACEAE							
Fissidens asplenioides Hedw.	★	○	●	●	○	C T WS	QVTYSW
F. crassipes Wils. ex B.S.G.	○	○	★	○	○	C CT ST	VTS
F. humilis Dix. & Watts	○	○	★	★	○	C CT ST SWP	QVTSW
F. leptocladus C. Muell. ex Rodway	★	★	●	★	○	C T SWS	QVTSW
F. pungens C. Mucll. & Hampe	○	★	★	★	○	C T CWS	QVTYSW
F. rigidulus Hook. f. & Wils. ssp. **rigidulus**	★	★	●	○	○	C T CWS	VT
F. taylorii C. Muell.	●	○	●	●	●	C T WS NFWP	VTSW
F. tenellus Hook. f. & Wils.	○	○	★	★	○	LHI NC CC CT ST	QVTS
F. vittatus Hook. f. & Wils.	○	★	●	★	○	NC CC T CWS SWS NFWP	VTSW
5. DITRICHACEAE							
Ceratodon purpureus (Hedw.) Brid.	●	●	●	●	★	LHI C T WS NWP FWP	QVTYSW
Distichium capillaceum (Hedw.) B.S.G.	○	○	○	★	○	ST SWS	V?T
Ditrichum cylindricarpum (C. Muell.) F. Muell. [*D. elongatum* (Hook. f. & Wils.) Mitt.]	○	★	●	★	○	ST only	VTS
D. difficile (Dub.) Fleisch.	★	●	●	●	○	C T WS	QVTSW
Eccremidium pulchellum (Hook. f. & Wils.) C. Muell.	○	○	○	★	○	CC CWS SWS NWP	QVTYSW
Pleuridium arnoldii (R. Br. ter.) Par.	○	★	○	○	○	ST only	V
P. krauseanum Par.	○	○	○	★	○	ST only	V
P. nervosum (Hook.) Mitt.	○	○	★	●	○	ST only	QVTSW
7. SELIGERIACEAE							
Blindia robusta Hampe	○	★	○	○	○	CT ST	VT

8. DICRANACEAE							
Campylopus austro-subulatus Broth. & Geh.	○	○	○	★	○	ST only	VS
C. clavatus (R. Br.) Wils.	○	★	★	★	○	LHI C T WS	QVTYSW
C. introflexus (Hedw.) Brid.	★	●	●	●	★	LHI C T WS	QVTYSW
C. pallidus Hook. f. & Wils.	★	○	●	○	○	LHI C CT ST CWS	QVTSW
†**Dicnemoloma pallidum** (Hook.) Wijk & Marg.	○	○	●	○	○	LHI C T WS	QVTS
Dicranoloma billardieri (Brid.) Par.	○	○	●	○	○	NC CC T	QVTS
D. dicarpum (Nees) Par.	○	○	★	○	○	NC CC T	QVT
D. robustum (Hook. f. & Wils.) Par. var. setosum (Hook. f. & Wils.) Sainsb.	○	★	★	○	○	CC T	T
Trematodon amoenum (C. Muell.) Stone & Scott	○	○	○	★	○	CT	V
T. flexipes Mitt.	○	★	○	○	○	ST only	VT
T. mackayi (R. Br. ter.) Broth.	○	★	★	○	○	ST only	VT
13. ENCALYPTACEAE							
Encalypta vulgaris Hedw.	★	★	●	○	●	NC SC T WS	VTS
14. POTTIACEAE							
Acaulon integrifolium C. Muell.	○	○	★	★	★	C T CWS	VYSW
Barbula calycina Schwaegr. [*Tortella calycina* (Schwaegr.) Dix.]	○	○	○	★	○	LHI C CT ST WS NFWP	QVTSW
B. crinita Schultz	○	○	★	●	★	C CT ST NWS CWS SWP SFWP	VTSW
B. hornschuchiana Schultz	○	○	○	★	○	ST only	VTSW
B. torquata Tayl.‡	○	○	○	★	○	CC CT ST CWS SWS WP FWP	VTYSW
B. unguiculata Hedw.	○	○	○	★	○	ST only	VT
Bryoerythrophyllum jamesonii (Tayl.) Crum [*B. binnsii* (R. Br. ter.) Wijk & Marg.]	○	○	★	○	○	ST only	VT
Desmatodon convolutus (Brid.) Grout	○	○	○	●	○	CC T WS WP FWP	QVTYSW
D. recurvatus (Hook.) Mitt.	○	○	★	★	○	NT ST	VS

† Retained here as *Dicnemoloma* although Crosby (pers. comm.) and Crosby & Magill (1981) point out this name is preceded by *Sclerodontium*.

‡ = *Didymodon* in Catcheside (1981).

	Name	Distribution						
		A. C. T.					N.S.W.	OTHER STATES
		1 Booth Ra.	*2 S. Ranges*	*3 Brindabella*	*4 Canberra*	*5 Kowen*		
	POTTIACEAE (cont'd)							
	Gymnostomum aeruginosum (Sm.) Zander [*G. calcareum* Nees & Hornsch.]	○	○	●	○	○	C CT ST WS	QVTYSW
	Leptodontium paradoxum Stone & Scott	○	○	★	★	○	ST only	VSW
	Pottia starckeana (Hedw.) C. Muell.	○	○	○	★	○	ST only	VS
	P. truncata (Hedw.) B.S.G.	○	○	○	●	○	CC ST	VTS
	Tetrapterum cylindricum (Tayl.) Jaeg.	○	○	○	★	○	T WS NFWP	QVTSW
	Tortula muralis Hedw.	★	○	○	●	○	NC CC T	VTSW
	T. papillosa Wils.	★	★	★	●	★	CC SC T CWS SWS	VTSW
	T. princeps De Not.	●	●	●	●	★	CC SC T WS SWP SFWP	VTSW
	T. rubra Mitt.	○	★	○	○	○	ST only	V
	Triquetrella papillata (Hook. f. & Wils.) Broth.	★	○	●	●	★	CC SC T WS	VTSW
	Weissia controversa Hedw.	★	★	●	●	●	LHI C T SW NWP NFWP	QVTSW
	W. novae-valesiae (Broth. ex Roth) Stone	○	○	★	○	○	CC ST	
14A.	**WYOBARTRAMIACEAE**							
	Wyobartramia novae-valesiae (Broth.) Stone	○	○	○	★	○	ST CWS SWS	VSW
15.	**GRIMMIACEAE**							
	Grimmia laevigata (Brid.) Brid.	●	★	●	★	○	LHI C T WS NWP SFWP	QVTSW
	G. pulvinata (Hedw.) Sm.	●	●	●	★	★	LHI C T WS NWP NFWP	QVYSW
	G. trichophylla Grev.	●	●	★	★	○	CT ST SWS	QVTSW
	Racomitrium crispulum (Hook. f. & Wils.) Hook. f. & Wils.	★	●	●	○	○	T	VTW
	Schistidium apocarpum (Hedw.) B.S.G.	●	●	●	●	★	C T WS	QVTSW

16. GIGASPERMACEAE							
Gigaspermum repens (Hook.) Lindb.	○	★	★	★	○	CC SC T NWS CWS WP NFWP	QVTYSW
19. FUNARIACEAE							
Funaria apophysata (Tayl.) Broth. ..	○	○	★	★	★	CC T WS NFWP	QVTYSW
F. glabra Tayl.	○	○	★	○	○	C T WS NFWP	QVTYSW
F. gracilis (Hook. f. & Wils.) Broth. ..	○	○	★	★	○	NC CC ST NWS SWS	VTYSW
F. hygrometrica Hedw.	○	○	★	●	★	LHI C T NWS SWS CWS SFWP	QVTYSW
Goniomitrium acuminatum Hook. & Wils.	○	○	○	★	○	CC ST CWS	QYSW
G. enerve Hook. & Wils.	○	○	○	★	○	CC NT ST NWS CWS NWP NFWP	VSW
Physcomitrium pyriforme Brid. .. .. [*P. conicum* Mitt.]	○	○	★	○	○	CC ST	VT
21. SPLACHNACEAE							
Tayloria octoblepharum (Hook.) Mitt.	○	★	●	★	★	C T	QVTSW
24. BRYACEAE							
Brachymenium coarctum Bosch & Lac.	○	○	○	★	○	NC CC	T
B. exile (Dozy & Molk.) Bosch & Lac.	○	○	○	★	★	ST only	
B. *cf.* **preissianum** (Hampe) Jaeg.	○	○	○	★	○	CC	QVTYSW
Bryum *cf.* **altisetum** C. Mucll.	○	○	★	★	○	ST only	VA
B. apiculatum Schwaegr. .. .. .. [Ochi (pers. comm.) identified A.C.T. specimens as *B. apiculatum* and put *B. nitens* into synonymy; the former name is not used in main census.]	○	○	★	★	○	NC CC CT ST	Q
B. argenteum Hedw.	★	★	●	●	○	LHI C T WS FWP	QVTYSW
B. *cf.* **australe** Hampe	★	○	★	○	○	CC ST	VT
B. billardieri Schwacgr. var. **billardieri**	○	●	●	●	●	LHI C T WS	QVTSW
B. blandum Hook. f. & Wils. var. **blandum**	★	○	★	○	○	CT ST	VT
B. caespiticium Hedw.	○	○	★	○	○	CC CT ST NWS	VTS

Name	Distribution						
	A. C. T.					N.S.W.	OTHER STATES
	1 Booth Ra.	*2* S. Ranges	*3* Brindabella	*4* Canberra	*5* Kowen		
BRYACEAE (cont'd)							
B. campylothecium Tayl.	○	○	★	★	○	LHI CT ST CWS SWS SWP	VTSW
B. capillare Hedw.	★	★	●	★	★	LHI C CT ST WS NFWP	QVTYSW
B. coronatum Schwaegr.	○	○	○	★	○	LHI C CT ST CWS	QW
B. dichotomum Hedw.	★	○	★	●	★	LHI CC CT ST SWS NFWP	QVTS
B. erythrocarpoides (C. Muell.) Hampe† [*B. curvicollum* Mitt., *B. clavatum* Hook. f. & Wils].	○	○	★	★	○	LHI NC CC T CWS	QVTS
B. laevigatum Hook. f. & Wils.	★	★	●	★	★	NC CC ST SWS	VT
B. *cf.* **muehlenbeckii** B.S.G.	★	○	○	○	○	CC ST	
B. pachytheca C. Muell.	★	○	●	●	○	C CT ST CWS	QVTYSW
B. *cf.* **pallens** Sw.	○	○	★	○	○	ST only	
B. pseudotriquetrum (Hedw.) Gaertn.	○	★	○	★	○	CC ST	VT
B. subapiculatum Hampe	○	○	★	○	○	ST only	
Leptobryum pyriforme (Hedw.) Wils.	○	○	★	●	○	CC ST	VTS
Mielichhoferia bryoides (Harv.) Wijk & Marg.	○	★	●	●	○	SC CT ST	VTS
Orthodontium lineare Schwaegr.	○	○	●	○	○	CC T	VTSW
Pohlia nutans (Hedw.) Lindb.	○	●	●	●	○	CC T	VT?S?W
P. wahlenbergii (Web. & Mohr) Andrews	●	★	●	○	○	NT ST SWS	VT
25. LEPTOSTOMATACEAE							
Leptostomum inclinans R. Br.	★	●	○	○	○	NC NT ST NWP	QVT
30. MITTENIACEAE							
Mittenia plumula (Mitt.) Lindb.	○	★	●	○	○	C CT ST	QVTW

† see Ochi (1980).

32. RHIZOGONIACEAE							
Leptotheca gaudichaudii Schwaegr. ..	○	●	●	○	○	SC T CWS	QVT
Pyrrhobryum mnioides (Hook.) Wils.	★	●	●	○	○	C T	QVT
Rhizogonium bifarium (Hook.) Schimp.	★	★	○	○	○	CC NT ST	VT
R. distichum (Sw.) Brid.	○	○	★	○	○	NC CC CT ST	QVT
R. novae-hollandiae (Brid.) Brid. ..	○	○	★	○	○	NC CC CT ST	VT
33. HYPNODENDRACEAE							
Hypnodendron vitiense Mitt. ssp. **australe** Touw	○	★	●	○	○	C T SWS	QVT
34. AULACOMNIACEAE							
Aulacomnium palustre (Hedw.) Schwaegr.	○	●	★	★	○	NC ST	VT
35. MEESIACEAE							
Meesia muelleri C. Muell. & Hampe	★	●	●	○	○	ST only	V
M. triquetra (L.) Aongstr.	○	○	●	○	○	ST only	V
37. BARTRAMIACEAE							
Bartramia hampei (Mitt.) Catcheside	○	○	○	●	○	NT ST CWS	VTW
B. papillata Hook. f. & Wils.	★	●	●	●	●	CC T WS	VTSW
B. *aff.* stricta Brid.	○	○	★	○	○	CC T NWS SWS	QVTSW
Breutelia affinis (Hook.) Mitt.	★	★	●	●	●	CC SC T WS	VTSW
B. pendula (Sm.) Mitt.	★	●	●	★	○	C T NWS	VTW
Conostomum curvirostre (Mitt.) Mitt.	○	★	★	○	○	ST only	V
C. pentastichum (Brid.) Lindb.	○	★	○	○	○	ST only	VT
C. pusillum Hook. f. & Wils.	○	★	★	○	○	CT ST	VT
Philonotis scabrifolia (Hook. f. & Wils.) Braithw.	○	○	●	●	★	T CWS	VTSW
P. *cf.* tenuis (Tayl.) Reichdt.	○	★	●	★	★	LHI NC CC CT ST SWP NFWP	QVTSW
41. PTYCHOMITRIACEAE							
Ptychomitrium australe (Hampe) Jaeg.	★	★	●	●	●	LHI NC SC T NWS CWS SWP	QVTSW
42. ORTHOTRICHACEAE							
Macromitrium ligulare Mitt.	○	★	○	○	○	LHI NC SC T	QT
Orthotrichum cupulatum Hoffm. ..	○	○	★	○	○	ST only	V
O. longithecum R. Br. ter.	●	●	●	○	○	ST CWS SWS	V

Name	Distribution						
	A. C. T.					N.S.W.	OTHER STATES
	1 *Booth Ra.*	*2* *S. Ranges*	*3* *Brindabella*	*4* *Canberra*	*5* *Kowen*		
ORTHOTRICHACEAE (cont'd)							
O. rupestre Schleich. ex Schwaegr. ..	★	●	★	○	○	ST SWS	VT
O. tasmanicum Hook. f. & Wils.	★	●	●	○	○	CC CS CT ST	QVTS
Zygodon intermedius B.S.G.	○	●	●	○	○	SC CT ST SWS	VTW
Z. menziesii (Schwaegr.) Arnott	○	○	★	○	○	ST only	VTSW
44. RACOPILACEAE							
Racopilum cuspidigerum (Schwaegr.) Aongst. var. **convolutaceum** (C. Muell.) Zant. & Dijkstra	★	○	○	★	○	LHI C T CWS	QVTSW
47. HEDWIGIACEAE							
Hedwigia ciliata (Hedw.) Ehrh. ex P. Beauv.	●	●	●	○	○	C T WS WP	QVTSW
H. integrifolia P. Beauv.	●	★	●	○	○	C T CWS SWS	VTSW
Rhacocarpus purpurascens (Brid.) Par.	○	○	○	★	○	C CT ST	VTW
48. CRYPHEACEAE							
Cryphaea tasmanica Mitt.	○	★	○	○	○	CT ST	VT
51. PTYCHOMNIACEAE							
Glyphothecium sciuroides (Hook.) Hampe	○	○	★	○	○	ST only	VT
59. PHYLLOGONIACEAE							
Catagonium politum (Hook. f. & Wils.) Dus. ex Broth.	○	★	★	○	○	LHI NC T	QVT
60. NECKERACEAE							
Leptodon smithii (Hedw.) Web. & Mohr	★	★	○	○	○	C CT ST WS	QV
Thamnobryum pumilum (Hook. f. & Wils.) Nieuwl.	○	○	★	○	○	LHI C ST	QVT

61. LEMBOPHYLLACEAE							
Camptochaete arbuscula (Sm.) Reichdt.	o	o	●	★	o	LHI C CT ST	QVT
Lembophyllum divulsum (Hook. f. & Wils.) Lindb.	★	o	●	★	★	NC SC T	QVTS
65. HOOKERIACEAE							
Achrophyllum dentatum (Hook. f. & Wils.) Vitt & Crosby	o	●	●	o	o	LHI C T	VTS
Distichophyllum microcarpum (Hedw.) Mitt.	o	o	★	o	o	SC CT ST	VTS
D. pulchellum (Hampe) Mitt.	★	o	★	o	o	C CT ST	QVTS
Sauloma tenella (Hook. f. & Wils.) Mitt.	o	o	★	o	o	NT ST	VT
68. HYPOPTERYGIACEAE							
Hypopterygium rotulatum (Hedw.) Brid.	o	o	●	★	o	LHI C T	QVTS
70. FABRONIACEAE							
Fabronia australis Hook.	●	o	●	●	★	C CT ST CWS SWS SWP NFWP	QVTSW
F. brachyphylla C. Muell.	o	o	★	o	o	NC CC ST	Q
71. LESKEACEAE							
Pseudoleskea imbricata (Hook. f. & Wils.) Broth.	●	●	●	★	★	C T WS	VTS
72. THUIDIACEAE							
Anomodon tasmanicus Broth.	o	o	●	o	★	ST only	VTSW
Thuidium furfurosum (Hook. f. & Wils.) Reichdt.	★	★	●	o	o	LHI C T NWS SWS NWP	QVTSW
T. furfurosum (Hook. f. & Wils.) Reichdt. var. **sparsum** (Hook. f. & Wils.) Sainsb.	★	★	●	★	★	SC NT	QVTSW
T. laeviusculum (Mitt.) Jaeg.	o	●	★	o	o	C NT ST	QVT
T. subglaucinum Card.	o	o	★	o	o	ST only	—
73. AMBLYSTEGIACEAE							
Acrocladium chlamydophyllum f. & Wils.) C. Mucll. & Broth.	o	o	●	o	o	NC NT ST	VTS
Calliergonella cuspidata (Hedw.) Loeske	o	★	o	o	o	ST only	VT

Name	Distribution						
	A. C. T.					N.S.W.	OTHER STATES
	1 *Booth Ra.*	*2* *S. Ranges*	*3* *Brindabella*	*4* *Canberra*	*5* *Kowen*		
AMBLYSTEGIACEAE (cont'd)							
Campylium polygamum (B.S.G.) C. Jens.	○	★	★	○	○	CC ST	V
Cratoneuropsis relaxa (Hook. f. & Wils.) Fleisch.	●	●	●	★	○	NT ST	VTS
Drepanocladus aduncus (Hedw.) Warnst.	★	★	○	○	○	ST only	VTS
D. fluitans (Hedw.) Warnst. [also known as *Warnstorfia fluitans* (Hedw.) Loeske]	○	★	○	○	○	ST only	VTS
D. uncinatus (Hedw.) Warnst. [also known as *Sanionia uncinata* (Hedw.) Loeske]	○	★	○	○	○	ST only	VT
Leptodictyum riparium (Hedw.) Warnst.	●	○	★	○	○	NC CC NT ST CWS NWP	VS
74. BRACHYTHECIACEAE							
Brachythecium albicans (Hedw.) B.S.G.	○	○	○	★	○	ST only	VT
B. paradoxum (Hook. f. & Wils.) Jaeg.	○	●	●	○	○	NT ST	VT
B. plumosum (Hedw.) B.S.G.	○	○	★	○	○	C NT ST	—
B. rutabulum (Hedw.) B.S.G.	○	★	●	○	○	CC SC T	VTS
B. salebrosum (Web. & Mohr) B.S.G.	★	○	●	●	○	SC ST	VT
Eurhynchium austrinum (Hook. f. & Wils.) Jaeg.	★	○	●	○	○	NC SC NT ST SWS	VT
Rhynchostegium *cf.* **dentiferum** (Hampe) Jaeg.	○	○	★	○	○	CT ST	V
R. laxatum (Mitt.) Par.	○	○	●	○	★	CT ST	VT
R. tenuifolium (Hedw.) Reichdt.	○	★	●	●	●	LHI C T CWS SWS	QVTSW
77. SEMATOPHYLLACEAE							
Sematophyllum amoenum (Hedw.) Mitt.	○	○	●	○	○	LHI CC T	QVTSW
S. contiguum (Mitt.) Mitt.	○	○	●	○	○	LHI NC CT ST	QVTS
Wijkia extenuata (Brid.) Crum	○	○	●	○	○	LHI C T NWP	QVT

78. **HYPNACEAE**								
Hypnum cupressiforme Hedw.	●	●	●	●	●	LHI C T WS NWP	QVTSW
H. cupressiforme Hedw. var. **cupressiforme**	★	★	●	★	○	SC ST	VT
H. cupressiforme Hedw. var. **filiforme** Brid.	○	○	○	★	○	ST only	V
H. cupressiforme Hedw. var. **mossmanianum** (C. Muell.) Ando	○	○	★	○	○	ST only	VT
83. **POLYTRICHACEAE**							
Atrichum androgynum (C. Muell.) Jaeg. var. **androgynum**	○	○	●★	○	○	LHI CC SC T	QVT
Pogonatum subulatum (Brid.) Brid.	○	○	★	○	○	C T NWS	QVT
Polytrichastrum alpinum (Hedw.) G.L. Smith	○	★	●●	○★	○	ST only	VT
Polytrichum commune Hedw.	○	●●	●●	●●	○	NC T	QVT
P. juniperinum Hedw.	●	●	●	●	★	CC SC T WS	QVTS
84. **DAWSONIACEAE**							
Dawsonia longiseta Hampe	○	○	★	●	○	C CT ST WS SWP	QVTS

SUMMARY OF DATA

A total of 180 species are recorded from 39 families. There are no type specimens for which the collection site is listed in the A.C.T. Species that have been attributed to the A.C.T. in Scott & Stone (1976), but for which no specimens have been located, have not been included here.

Species diversity within the five areas described varies greatly. Kowen Forest (Division 5) contains only 34 of the listed species. This area is the smallest with less variation in habitat and has been affected by cultivation, e.g. *Pinus radiata* forests. The Brindabella Ranges (Division 3) have a great range in altitude and habitat from river flats to alpine regions and also have the greatest diversity — 137 species. Although the Canberra Plain (Division 4) is most influenced by settlement, with the City of Canberra and grazing properties covering extensive areas, the moss flora is as diverse (89 species) as in the Southern Ranges (Division 2) (83 species) where there are greater differences in altitude and vegetation and little disturbance has occurred. This latter area is perhaps undercollected at present. The Booth Range (Division 1), which also has had little disturbance by settlement or grazing, has a surprisingly low species number (55 species). Again the area may be undercollected at present.

The relationships and distribution of mosses in the A.C.T. are primarily with temperate species in southern Australia, mainly Victoria and Tasmania. Of the species represented, only 69 occur also in Queensland and most of these are species that have a wider extra-Australian range. There are 35 taxa that have been collected only in the Southern Tablelands of New South Wales although all but two, *Thuidium subglaucinum* and *Brachythecium plumosum,* occur elsewhere in Australia.

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*For a full reference list see Ramsay, H.P. (1984), Census of New South Wales mosses, *Telopea* (2)5: 455-533.

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